DOCUMENT RESUME

ED 074 028 SP 006 140

AUTHOR	Dieter, Donn Louis
TITLE	Evaluation of Biology Teachers.
PUB DATE	72
NOTE	184p.; Doctoral dissertation, University of North Carolina at Chapel Hill
EDRS PRICE	MF-$0.65 HC-$6.58
DESCRIPTORS	*Biology Instruction; *Occupational Aspiration; *Performance Criteria; Research Projects; *Teacher Evaluation; *Teacher Qualifications; Values

ABSTRACT

The purposes of this study were to identify the criteria that are used for evaluating the competencies of biology teachers, to determine the relative importance of these criteria, and to determine if the occupational status of judges affects the way they value specific criteria. The study group consisted of 220 selection committee members of the Outstanding Biology Teacher Award program of the National Association of Biology Teachers which was conducted in 46 states in 1970. The general methods and instruments employed included a review of literature, a questionnaire, and analysis of questionnaire responses. Statistical analysis indicated no significant differences existed between ratings given to items when used for preselection and the ratings given to the same items when used for the final evaluation of candidates for the Outstanding Biology Teacher Award. Results also indicated that the occupational status of various judges does relate to the way they might value some criteria. Recommendations are suggested. An extensive bibliography and appendixes of related material are included. (Author/MJM)

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EVALUATION OF BIOLOGY TEACHERS

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by

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A Dissertation submitted to the faculty of the University of North Carolina in partial fulfillment of the requirements for the degree of Doctor of Education in the School of Education.

Chapel Hill

1972

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SP 006 140

DONN LOUIS DIETER. Evaluation of Biology Teachers (Under the direction of PAUL B. HOUNSHELL.)

The purposes of this study were to identify the criteria that are used for evaluating the competencies of biology teachers, to determine the relative importance of these criteria, and to determine if the occupational status of judges affects the way they value specific criteria. The study attempted to answer the following questions:

1. Who are these judges of biology teachers? What variety of occupational and/or educational positions do they hold?
2. What criteria do they employ in the evaluation process? Are some criteria of more value to some judges than others?
3. Does the occupational status of a judge relate to the way he evaluates a biology teacher? If so, in what ways?

The study group consisted of the two hundred twenty selection committee members of the Outstanding Biology Teacher Award program of the National Association of Biology Teachers which was conducted in forty-six states in 1970. Seven distinct occupational types were represented by the study group.

The general methods and instruments employed in this study are as follows:

1. From review of the literature and from the materials, forms and procedures of the Outstanding Biology Teacher Award program, a list of items was developed which might be utilized as criteria when evaluating biology teachers.
2. A questionnaire containing these items was sent to the study group following completion of their respective selection processes, for the rating of individual items as to their importance when evaluating candidates for the award.
3. Responses of returned questionnaires were analyzed to determine:
   a. The frequency and significance of the differences between each rating level for each item, within each separate judge-group;
   b. The frequency and significance of differences between each rating level, for each item, between each separate judge-group; and
   c. The significance of differences seen between responses for each item when rated for both the prescreening and final evaluation phases.

Statistical analysis yielded the following results.

Chi square levels derived for the combined ratings of all judges revealed that no significant differences existed between the ratings given to items when used for preselection and the ratings given to the same items when used for the

final evaluation of candidates for the Outstanding Biology Teacher Award.

Analysis of the chi square levels derived for the ratings given to each of the one hundred eleven items revealed that some significant criteria exist and there were twenty-three items that possessed rating levels that differed from that might have occurred by chance at the .05 level of significance. Of these, twenty-one were rated significantly high.

Of the twenty-one items rated high, seven related to factors associated with the teacher's intrinsic personal characteristics, eight related to factors of teacher-student interaction, and six related to skills and proficiencies as a science teacher. Factors of no significance included those related to the teacher's participation in school and community activities, academic background, and teaching and professional experiences and accomplishments.

Analysis of chi square derivations for ratings of each of the one hundred eleven items of the questionnaire revealed that eight items were rated significantly different by different judge-groups. Thus, it was possible to say that the occupational status of various judges does relate to the way they might value some criteria.

ACKNOWLEDGMENTS

The author wishes to express his deep appreciation to Drs. J. Hunter Ballew, Jack E. Blackburn, Claiborne S. Jones, and Haywood Arnold Perry for their continuing encouragement and counsel as members of his doctoral committee. He is especially indebted to his major adviser, Dr. Paul B. Hounshell, for his invaluable encouragement provided throughout the period of recent graduate studies and particularly for the direction and advice given during the conduct of the investigation. He wishes to thank the many officers and directors of the National Association of Biology Teachers for their very kind and thoughtful suggestions and for their continued assistance and support.

A debt of gratitude is also due to Drs. Harold T. Conner and Edwin L. West, Jr. for their critique and suggestions and to the various members of the staff of the North Carolina Department of Public Instruction who contributed in many ways to the study.

Finally, he wishes to thank his wife and children for their immeasurable patience and help throughout the entire period of study.

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CHAPTER I

NATURE AND SIGNIFICANCE OF THE STUDY

Introduction

Perhaps no other area of education has evoked as much interest or has stimulated more recent research as has the area of the evaluation of teacher effectiveness.[1] However, although often researched in depth, results of many of these studies have been conflicting and there seems to be little agreement among some investigators over findings.[2] Review of the literature reveals particular concern and interest for the identification of suitable criteria which might be applied in a program of teacher evaluation; the appropriateness and qualifications of those who evaluate teachers; and the subjective bias introduced by judges possessing varying role expectations and value systems.[3] In addition, many

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[1] Bruce J. Biddle and William J. Ellena (eds.), Contemporary Research on Teacher Effectiveness (New York: Holt, Rinehart and Winston, 1964), p. v.

[2] K. Fred Daniel, The Measurement and Evaluation of Teaching, a Conceptualization of a Plan for Use in State Educational Leadership (Tallahassee: Florida State Department of Education, 1967), pp. 9-10.

[3] Felix M. Lopez, "Accountability in Education," Phi Delta Kappan, LII (December, 1970), 231-32; Dale L. Bolton,

studies of teacher evaluation are apparently based on what evaluators feel desirable in teachers generally, rather than on what might be desired of a specific subject specialist. For example, even though it is not uncommon for teachers to be evaluated in terms of their suitability for, or success in a particular teaching situation, there have been no comprehensive studies of how biology teachers might be evaluated differently from teachers of other subjects.

Purpose of the Study

In 1961, a nationally known professional biology teachers association initiated a program through which a secondary school teacher from each state is selected each year for recognition as an "Outstanding Biology Teacher." An avowed purpose of the program is:

> To select a representative in each state from the many outstanding biology teachers which there are in order that public attention as well as attention from within the teaching profession itself can be focused upon such excellence.[4]

Awards are made by members of state selection committees who solicit nominations, review candidate record forms,

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Developing Criteria for Teacher Evaluation, U. S. Department of Health, Education, and Welfare, Office of Education Prep Report 21-E (Washington: National Center for Educational Communications, 1971), pp. 2-3; and Donald Musella, "Improving Teacher Evaluation," Journal of Teacher Education, XXI (Spring, 1970), 18-49.

[4]Robert Yager, "An Outstanding Biology Teacher Award Program," American Biology Teacher, XXVI (March, 1964), 192-93.

and visit finalists in their schools. Since 1962 more than four hundred biology teachers have been selected to receive the award.

Who are these judges of biology teachers? What criteria do they use? Does the occupational status of a judge bias his evaluation? Do members of different judge-groups value specific criteria differently? If so, to what extent?

The purposes of this study were to (1) identify the criteria that members of the Outstanding Biology Teacher Award program selection committees utilize when evaluating biology teachers, (2) to identify the various types of occupations held by members of selection committees, (3) to determine if the occupational status of evaluators within a judge-group is related to the way they value specific criteria, and (4) to determine the relative importance of various criteria to ascertain if a value hierarchy of criteria exists.

Definitions of Terms

The terms which have special meanings with respect to the study are as follows:

1. Evaluative Criteria. Any factor used by members of state selection committees as aids to their screening or final evaluation of candidates to receive the award.

2. Award Candidate. Any secondary school biology teacher who was evaluated for the 1970 Outstanding Biology Teacher award.

3. Occupational Status. The type of job position held by a member of an Outstanding Biology Teacher Award (OBTA) program selection committee (i.e., school administrator, local school science supervisor, state science supervisor, industrial biologist, college biologist, or professor of science education).

4. Selection Committee Member. Any person who assisted in the evaluation of candidates for the Outstanding Biology Teacher Award.

5. Judge-Group. A group of selection committee members having similar occupational status.

Limitations and Basic Assumptions

This study was limited to consideration of selection committee members and the criteria involved in the 1970 Outstanding Biology Teacher Award program. It was also limited to the adequacy of the instrument used and of the responses received. Basic assumptions made in the study were that:

1. Members of selection committees are appointed for their ability to recognize outstanding biology teaching and that these persons are competent to judge biology teachers.
2. Criteria exist which characterize outstanding biology teaching.
3. Members of selection committees employ these criteria when making decisions about the suitability of candidates for the award.

4. A "value hierarchy" of criteria exists, with some criteria being of more importance than others in evaluating candidates for the award.
5. Assessment of candidates for the outstanding biology teacher award is subjective and that individual members of selection committees value specific criteria differently.

Significance of the Study

In one of the studies cited in Chapter II,[5] it is suggested that teacher evaluation is rarely objective, that different evaluators bring different expectations and values into the evaluation process, and that there are no standard sets of behaviors or educational objectives which can be uniformly applied as criteria in teacher evaluation processes. It is further suggested that as a step toward predicting the effectiveness of a teacher in a specific situation, it is necessary to establish the role expectations of judges which influence their evaluations. If this is done, it might be possible to facilitate success of a given teacher by placing him in a teaching situation with those who value his unique characteristics.

Accepting this view, analysis of the ratings given to

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[5]Garth Sorenson and Cecily Gross, Teacher Appraisal, a Matching Process (Los Angeles: UCLA Center for the Study of Evaluation of Instructional Programs, 1961), passim, pp. 1-3.

the criteria used by various judge-groups in this study might reveal to the profession what various judges value, and perhaps make it possible to either select judges who are likely to be uniquely qualified to evaluate their traits, or, by knowing who is doing the judging, it might provide some teachers with insights into how their teaching is likely being appraised. Perhaps, too, the findings will prove useful to the OBTA program of the National Association of Biology Teachers and to the profession at large.

Organization of the Study

The following steps were followed in the organization of this study:

1. A review of the related literature;
2. Design and implementation of appropriate procedures for the collection and processing of data;
3. Presentation and analysis of the data; and
4. Presentation of the summary, conclusions, and recommendations.

Chapter II includes a representative review of the literature pertaining to: (1) the need for teacher evaluation, (2) problems in evaluation, (3) the nature of evaluative criteria, (4) who should evaluate teachers, (5) rater bias, and (6) the evaluation of biology teachers as done by the National Association of Biology Teachers.

Chapter III describes the design of the study and includes the hypotheses tested, the population studied, the

identification of the evaluative criteria, the design of the questionnaire, how responses to the questionnaire were elicited, and the statistical procedures used.

Chapter IV presents the tested hypotheses and includes the statistical data and tables which list the ratings given specific items by the various judge groups. Also included in this chapter are discussions of the significant findings of the study.

Utilizing data developed in the study, conclusions were formulated and recommendations were made regarding the evaluation of biology teachers. These are found in Chapter V.

A bibliography of selected references and appendices containing tables of data and materials used in the study follow Chapter V.

CHAPTER II

REVIEW OF LITERATURE

A recent report by the Committee on IOTA[1] (Instrument for the Observation of Teaching Activities) suggested that anyone planning to develop a project in teacher evaluation should understand that no other area of education has been explored with greater energy and persistence than teacher competence. A large number of studies and discussions have been directed to the identification, definition, and measurement of teacher competence, along with attempts to find means for its development. The Committee estimated that perhaps as many as two thousand researches in the area have been published.

As a consequence of their analysis of teacher effectiveness studies, Biddle and Ellena wrote that:

> Probably no aspect of modern education has been discussed with greater frequency, with as much deep concern, or by more educators than has been that of teacher effectiveness--how to define it, how to identify it, how to measure it, how to evaluate it, and how to detect and remove obstacles to its achievement.[2]

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[1]Ruth Bradley and others, Measuring Teacher Competence: Research Backgrounds and Current Practice (Burlingame: California Teachers Association, 1964), p. 7. (Hereinafter cited as Bradley and others, Measuring Teacher Competence.)

[2]Bruce J. Biddle and William J. Ellena (eds.), Contemporary Research on Teacher Effectiveness (New York:

Need for Evaluation

The need for evaluation of competence has been demonstrated in almost every category of job and business relationship. Reasons for evaluating teachers, as suggested by Gwynn included:

1. Decisions to grant or remove from tenure.
2. Determination of salary.
3. Determining advancement, not only for promotion in the administrative hierarchy, but also in the selection of individual teachers for special projects.
4. Stimulation of teacher growth.
5. Protection of the teacher against injustice, caprice, ill formed judgments, and antagonistic minority pressures.
6. Administrative reports to higher officers and the public.
7. Protection of the pupil against the hazards of poor teaching.
8. Identification of better teaching.[3]

The Educational Research Service of the National Education Association (NEA)[4] found during a recent survey that two hundred eighteen out of a sample of two hundred thirty-five systems enrolling sixteen thousand or more pupils had established formal procedures for evaluating teachers. Of these, more than half had a regular schedule of annual evaluations. In considering teacher evaluation as an item of negotiation, the NEA research division[5] found

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Holt, Rinehart and Winston, 1964), p. v.

[3] J. Minor Gwynn, Theory and Practice of Supervision (New York: Dodd, Mead and Company, 1963), p. 40.

[4] "Evaluation of Teaching Competence," NEA Research Bulletin, XXXVI (October, 1969), 67.

[5] Ibid., p. 72.

that sixty-three percent of six hundred three comprehensive agreements on file contained provisions for such evaluation. Reasons listed for evaluating teachers elicited in the survey were:

- To assist in improving teaching competence--(92.8%)
- To keep the administration aware of what is taking place in the classroom--(59.1%)
- To make teachers more responsive to needs of their pupils--(56.0%)
- To make it possible to dismiss poor teachers--(53.8%)
- To assist in the selection of teachers for promotion to other positions--(47.3%)
- To have a statement in the teacher's permanent record for future reference--(31.0%)
- To see if the curriculum is being followed--(22.9%)
- For advancement on the salary schedule--(17.3%)
- For the awarding of merit pay--(16.7%)
- Other--(2.4%)[6]

The National Education Association Department of Classroom Teachers formulated a statement regarding teacher evaluation which required that the professional teaching organization be involved in teacher evaluation processes. It also stated that it

> regards the improvement of instruction as the major purpose of evaluation of teacher competence, . . . that such evaluation [is] effective only when done as a co-operative endeavor by all concerned, [and] that such evaluation should be based primarily upon performance of the teaching task in relation to the specified teaching situation in which the task is performed.[7]

It further maintained that evaluation must be continuous,

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[6] Ibid., p. 71.

[7] National Education Association, The Platform and Resolutions, 1963-64 (Washington: NEA Department of Classroom Teachers, 1964), p. 3.

must be based upon all educational factors, and should include considerations of the type of community, building facilities, and administrative practices as well as classroom procedures.

The Department of Elementary School Principals of the National Education Association in 1957 adopted a similar statement which is still in effect. Believing that "evaluation for the improvement of teaching is an obligation of school personnel and requires professional preparation and competence," the group feels that "evaluation is necessary in selective recruitment, appointment to teaching positions, determination of tenure, and the continued development of professional skills."[8]

In another study considering the need for evaluation of classroom teaching, the National Education Association[9] conducted a survey among superintendents, principals and teachers and found that all three groups felt evaluation stimulated efforts to improve instruction. They also found that it stimulated development of good rapport between teachers and administrative staff, that there was more understanding of what was needed, and that good evaluation

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[8] "Excerpts from a Report of Resolutions Committee," National Elementary Principal, XXXVI (May, 1957), 31-32.

[9] "What Teachers and Administrators Think About Evaluation," NEA Research Bulletin, XLII (December, 1964), passim, 108-11.

helped to expose outstanding teaching which might not be otherwise noted. Other desirable outcomes found were that it encouraged better administrative planning and that it provided means by which to rid the school system of really incompetent teachers.

It is apparent that the evaluation of teachers and teaching is an accepted aspect of the educational process, and that evaluation is conducted to satisfy a variety of needs. Also, it is evident that responsibility for teacher evaluation is claimed by individuals and groups having different purposes. Do differences in the needs for evaluation create special problems for the evaluator? Are there some problems of evaluation which exist, in common, regardless of the purpose of an evaluation?

Problems in Evaluation

In most professions, evaluation of the effectiveness of personnel appears to be less of a problem than is the evaluation of teachers. It seems relatively simple to measure effectiveness when a definite process of operation or the quality of a manufactured product is involved. Evaluation of teaching seems to be less simple.

In a paper stating their position on the evaluation of instructional programs, the Illinois Elementary School Principals' Association made note of the complexities of the task and indicated that, in their opinion, evaluation of teachers is difficult because there appear to be no

absolutes in education, and that there is no universal agreement about what constitutes a good teacher since "evaluation implies measurement, and measurement implies the use of standards which are virtually non-existent in the educational setting."[10] In addition, the Illinois group[11] noted that evaluation includes the problem of separating assessment of teaching from the assessment of the teacher. They recognized that the interrelationships which exist between the two make separation most difficult, necessitating a definition of what constitutes good teaching, as well as determining those teacher variables which contribute and those which do not contribute to instruction.

A report by the American Educational Research Association[12] referred to problems of definition and suggested that much of the confusion is due to disagreement over what is meant by terms such as "teacher competence," "teacher performance," and "teacher personality." Biddle[13] noted

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[10]Illinois Elementary School Principals' Association, Evaluation of the Instructional Program, a Position Paper (Springfield: The Association, 1968), p. 6. (Hereinafter cited as Illinois Elementary School Principals' Association Evaluation of the Instructional Program.)

[11]Ibid., p. 4.

[12]American Educational Research Association, "Report of the Committee on the Criteria of Teacher Effectiveness," Review of Educational Research, XXII (May, 1952), 238-63.

[13]Bruce J. Biddle, "The Integration of Teacher Effectiveness Research," Contemporary Research on Teacher Effectiveness, eds. B. J. Biddle and W. J. Ellena (New York: Holt, Rinehart and Winston, 1964), passim, 1-40.

that literally thousands of terms have been used to describe or classify teacher behavior and felt that the problem seems to be so complex that no one knows or can agree upon the meaning or description of a competent teacher.

Ornstein[14] stated that even when there is agreement on "good" teacher behavior, it is wrong to assume that there is a commonly agreed upon meaning regarding the words used to describe such behavior.

Daniel, in considering ways to develop and implement a statewide teacher evaluation plan, found that little is known about what makes the work of the individual teacher effective because "information relating to the process or prerequisites for teaching is subject to multiple interpretations," and, although research attempting to elucidate the topic has been extensive, "findings with practical applicability are meager."[15]

Mood concurred in this view but felt that even though many investigators believe that the teacher is the most important factor in the educational development of most

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[14]Allen C. Ornstein, "Systematizing Teacher Behavior Research," Phi Delta Kappan, LII (May, 1971), 551-55. (Hereinafter cited as Ornstein, "Systematizing Teacher Behavior.")

[15]K. Fred Daniel, The Measurement and Evaluation of Teaching, a Conceptualization of a Plan for Use in State Educational Leadership (Tallahassee: Florida State Department of Education, 1967), p. 970. (Hereinafter cited as Daniel, The Measurement and Evaluation of Teaching.)

children, this "belief rests largely on judgment and does not give us any clue as to how it operates."[16]

Bolton felt that "there is general agreement among educators that the most important purposes for evaluating teachers is the improvement of instruction and to provide a basis for rewarding superior performance."[17] However, if student achievement is accepted as a goal of teaching, it would seem desirable to isolate and measure the various types of teacher behavior that facilitate achievement for use when evaluating the teaching act. Although a great deal of work has been done in an attempt to discover and isolate factors of the teaching process which might lend themselves to standard measurement, this does not appear to be easily achieved.

Ellena, in looking at ways to identify the good teacher, said that:

> Even if pupil growth were measured accurately, there would still be the problem of determining how much could be ascribed to a particular teacher. Many influences shape pupil growth: the home, community, clubs, and organizations, various media of communication, books, magazines, and libraries are but a few of these influences. Also, the pupil was subjected to the influence

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[16]Alexander M. Mood, "Do Teachers Make a Difference?" (paper presented at a Conference Sponsored by the U. S. Office of Education, Bureau of Educational Professions Development, February, 1970, Washington, D. C.).

[17]Dale L. Bolton, Prep Brief 21-C, Purposes of Teacher Evaluation (Washington: National Center for Educational Communications, U. S. Office of Education, Department of Health, Education, and Welfare, 1971), p. 7.

> of other teachers in the past. The problem of disentangling these influences becomes difficult indeed. Though elaborate statistical and experimental methods have been developed, there is no one who can demonstrate a scientific way of making effective use of the pupil-gain criterion in measuring teacher effectiveness.[18]

Medley and Mitzel,[19] in reviewing research further, found that supervisory ratings of teacher effectiveness usually correlate poorly with measures of pupil gain.

Allon[20] suggested that teacher behavior categories are too poorly defined, with too many similarities between categories.

Dale Bolton said, "all teachers are evaluated. Regardless of how formal the evaluation is, what evidence is collected or analyzed, how often formal reports are written--teachers are evaluated and they are evaluated rather often."[21] In writing about evaluation in higher education Dressel[22] said, that when faced with a choice, evaluation, conscious or unconscious, occurs.

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[18] William J. Ellena, Margaret Stevenson, and Harold V. Webb, Who's a Good Teacher? (Washington: National Education Association, 1961), p. 19.

[19] D. M. Medley and H. E. Mitzel, "Some Behavioral Correlates of Teacher Effectiveness," Journal of Educational Psychology, L (December, 1959), 239-46.

[20] N. R. Allon, "Systems of Classroom Interaction Analysis: a Discussion of Structural Limitations," Journal of Experimental Education, XXXVIII (May, 1969), 1-3.

[21] Dale L. Bolton, Teacher Evaluation, U. S. Department of Health, Education, and Welfare, Office of Education Prep Report 21 (Washington: National Center for Educational Communications, 1971), p. 1.

[22] Paul L. Dressel and others, Evaluation in Higher Education (Boston: Houghton-Miflin Company, 1961), p. 9.

Regardless of whether "absolutes" or "standards" exist by which to establish levels of competence, whether there is agreement about definitions of terms used or in interpretation of the data collected, or whether judgments of observers are valid or reliable, evaluation does occur, and decisions about teachers are made. On what basis, then, are these decisions made?

Evaluative Criteria

One of the most mentioned concerns of those involved in teacher evaluation studies is that of the criteria used by various evaluators when rating teachers or the teaching process. In a study done to develop a statewide plan for the measurement and evaluation of teaching in Florida schools, K. Fred Daniel expressed his views about appropriate criteria and suggested that if information on teaching is to have any usefulness, there must be available some framework for use in interpretation and, without this framework, such evaluative information is mere description having no intrinsic value. Therefore, he suggested that the "first step in interpreting information on teaching consists of selecting relevant criteria with which the information can be evaluated."[23] Adhering to the concept that evaluation must be based on criteria and that local rather than state

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[23] Daniel, The Measurement and Evaluation of Teaching, p. 7.

personnel must be the ones to establish these criteria, he suggested that input from various educational practitioners be solicited, codified, and made available to both teachers and evaluators. With this information, beginning teachers could be given support as they begin teaching and schools or departments of education could adopt or integrate this body of knowledge into their programs. He also felt that "the ultimate result would be the wedding of the best elements from both the professors and the practitioners."[24] In looking for criteria which different groups might use to evaluate teachers, Daniel raised a number of significant questions. Among these were:

(1) What criteria do different colleges think relevant for evaluating the teaching of their graduates?
(2) Are these criteria the same for all graduates in the same or different teaching fields?
(3) In what ways does the teaching by graduates from different teacher education programs measure up to the evaluative criteria developed by the school and/or local school system?
(4) What evaluative criteria are considered relevant by individual school districts or schools?
(5) Are these evaluative criteria the same for all or most teachers in a school or school district?
(6) Are these evaluative criteria the same for all or most teachers of special grades or subjects?
(7) In what ways do teachers in specific schools measure up to evaluative criteria established by the local school district?
(8) Are there different criteria which are specific for different groups with the teaching population (e.g. beginning teachers, music teachers, sixth grade teachers, etc.)? Also, how do they compare?
(9) In what ways to evaluative criteria used by local schools compare with those used by colleges?

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[24] Ibid., p. 105.

(10) Are there different patterns of expectations for teachers in a given field?[25]

Where specific criteria have been identified, Lopez felt that such accountability measures are not adequate and do not meet even minimum levels of reliability or relevancy. He listed the following as reasons:

a) Criteria of effectiveness in a position generally lack clear specifications.
b) Objective measures, when examined closely, are usually found to be either nonobjective or irrelevant.
c) Subjective measures, when examined closely, are usually found to be biased or unreliable.
d) Seemingly adequate criteria can vary over time.
e) Position effectiveness is really multidimensional. Effectiveness in one aspect of a position does not necessarily mean effectiveness in others.
f) When effectiveness in different aspects of a position is measured, there is no sure way to combine these measures into a single index of effectiveness.
g) Different performance patterns achieve the same degree of effectiveness in the same job.[26]

Turner[27] found that even when the same evaluative criteria are used, it is possible for teachers having quite similar attributes to receive very different evaluations by supervisors when observed in different teaching environments.

In a paper on teacher selection, read at a meeting of the American Association of School Administrators, George

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[25] Daniel, The Measurement and Evaluation of Teaching, p. 13.

[26] Felix M. Lopez, "Accountability in Education," Phi Delta Kappan, LII (December, 1970), 231-32.

[27] R. L. Turner, Problem Solving Proficiency Among Elementary School Teachers (Bloomington: Indiana University Institute of Educational Research, 1964), p. 7.

Madden[28] expressed concern about the problem of variability of criteria, and he suggested that criteria used should reflect the changes taking place in the role of the teacher. In presenting this view he suggested that the older concept of the teacher as an all-round pedagogue--that is, one who is able to provide for all the educational needs of a group of children having widely differing abilities, interest, and motivations--is now giving way to a newer concept which conceives of teachers fitting a variety of roles, each designed to meet more effectively specific kinds of teaching and learning needs. He felt that each role must have a clearly different set of criteria, each specifying the different kinds of requirements for that role. In the past we were usually inclined to think of the good teacher in terms of a single model, while today this single model must be replaced with a set of varying models from which the appropriate one may be selected for a given teacher role.

Ghiselli[29] found that criteria used for evaluation of teacher effectiveness are very much like criteria used to select teachers because both vary from one job to another, and both tend to vary over time.

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[28]George R. Madden, "Teacher Selection--How to Weed Out the Duds" (paper read at the Annual Meeting of the American Association of School Administrators, February, 1968, Atlantic City, New Jersey), pp. 3-4.

[29]E. E. Ghiselli, "Dimensional Problems of Criteria," Journal of Applied Psychology, XL (February, 1956), 1-4.

In a search of the literature on the evaluation of faculty performance, Cohen and Brawer found that although hundreds of studies have been conducted over the years in every type of educational institution, none seemed to suggest a way of looking at teachers or the teaching situation that was "standardized, replicable, representative of the wishes of the profession, or acceptable to more than one group."[30] They further noted that observational descriptions are often confused with theoretical constructs and they stated that "teacher competence" is a quality which is dependent upon interpretation and something which cannot be observed directly. Although it is something which might be inferred from descriptions of teacher actions, "the term is often used as though the construct could itself be observed."[31]

The American Association for the Advancement of Science (AAAS) has long been interested in the question of competencies desired in teachers of science and mathematics and has developed guidelines and standards for use by various education agencies.

One suggested use of these guidelines is "in developing criteria for screening and for developing instruments

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[30]Arthur M. Cohen and Florence B. Brawer, Measuring Faculty Performance (Washington: American Association of Junior Colleges, 1969), p. 4.

[31]Ibid., p. 16.

and procedures for evaluating teacher competencies."[32] The AAAS group felt that a checklist of performance criteria should be developed to serve in "assisting future teachers in determining their own successes and failures, in identifying competencies they need before entering teaching, and in assessing for themselves the likelihood that they will become happy and successful teachers."[33] Although their validity is often disputed, such lists already exist and are frequently used.

Included in the NEA[34] research division report cited earlier is a description of suggested evaluative procedures to be followed and a list of criteria which might be applied. Some of these criteria pertain to the general categories to be rated, while others are more precise and list specific traits for each general category. For the general type, the NEA report[35] listed rating categories of the Capac, Michigan, schools: (a) Command of subject matter, (b) Effectiveness of instruction, (c) Initiative, (d) Cooperation, (e) Participation, (f) Reliability and personal responsibility, (g)

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[32] American Association for the Advancement of Science, Guidelines and Standards for the Education of Secondary School Teachers of Science and Mathematics (Washington: The Association, 1971), pp. 52-53. (Hereinafter cited as AAAS, Guidelines and Standards.)

[33] Ibid., p. 46.

[34] "Evaluation of Teaching Competence," p. 72.

[35] Ibid., pp. 72-73.

Leadership, (h) Growth potential, and (i) Participation in professional activities. As an example of the second type, the report included a checklist from the Hammond, Indiana, schools which divides three general categories into more specific traits as follows:

EVALUATION SECTION

1. Classroom Effectiveness
   - ___Relationship with pupils
   - ___Planning
   - ___Knowledge of subject(s)
   - ___Effectiveness of communication
   - ___Classroom atmosphere and control
   - ___Use of new and varied instructional material
   - ___Attention to individual needs
   - ___Adaptability to changing classroom situations
   - ___Attention to study skills and habits
   - ___Effectiveness in appraising learning

2. Attitudes and Professional Responsibilities
   - ___Relationship with parents
   - ___Relationship with colleagues
   - ___Willingness to assume responsibility for pupil behavior in all school situations
   - ___Takes steps toward self-improvement
   - ___Takes part in professional organizations
   - ___Accepts school staff assignments beyond classroom responsibility
   - ___Has respect for channels of authority
   - ___Complies with school and school system policies
   - ___Responsibility for routines
   - ___Attendance and punctuality

3. Personal Characteristics
   - ___Mental alertness
   - ___Enthusiasm
   - ___Dependability
   - ___Initiative
   - ___Perseverance
   - ___Resourcefulness
   - ___Tact
   - ___Poise and self-confidence
   - ___Self-control
   - ___Judgment
   - ___Dress and grooming[36]

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[36] Ibid., p. 74.

Also included in the NEA report[37] was a copy of the Okemos, Michigan, agreement which specified ten major areas for evaluation. Listed were: (a) Knowledge of subject matter, (b) Techniques of instruction (motivation), (c) Pupil-teacher relationships, (d) Curriculum development, (e) Daily preparation, (f) Pupil evaluation, (g) Classroom management, (h) Character development, (i) School-wide system effectiveness, and (j) Community relations. Each of these ten general areas was further divided and defined in terms of specific responsibilities and duties involved. For example, under (b) of the above:

> Responsibility: TECHNIQUES OF INSTRUCTION (MOTIVATION)
>
> The standard of performance for this responsibility is met when faculty personnel recognizes and provides for the pupil's interests, needs and abilities and apply instructional techniques which result in the level of learning commensurate with their potential.
>
> KEY DUTIES
>
> 1. Stimulates interest in prescribed areas of learning.
> 2. Challenges, encourages and guides critical thinking through use of stimulating questions and provocative ideas.
> 3. Uses a variety of methods in presenting subject matter.
> 4. Encourages a high quality of performance consistent with the individual's ability.
> 5. Leads pupils in solving problems significant to him.
> 6. Adapts teaching material and methods to the individual needs of the pupils.
> 7. Teaches groups and individual pupils in accordance with interests, needs and abilities.
> 8. Conducts discussions so that pupils learn to express ideas clearly, accurately and completely.

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[37] "Evaluation of Teaching Competence," p. 75.

9. Schedules times to meet curriculum requirements through long-range planning consistent with philosophy of course.
10. Makes clear assignments and directions with ample time allotment.
11. Develops desirable work and study habits by providing opportunities for the exercise of techniques of reading, organizing materials, etc.
12. Directs pupil who finishes assignments quickly into worthwhile activity.
13. Uses learning aids such as audio-visual material in a profitable manner.
14. Provides for testing and summarization.[38]

While the preceding were examples of evaluative criteria being applied in local school situations, K. Fred Daniel[39] in The Measurement and Evaluation of Teaching study found that three states--Pennsylvania, Florida, and Hawaii--had formal procedures for statewide teacher evaluation.

In Pennsylvania, evaluation of teachers was required and usually administered by the county or district superintendent, with actual rating done by school supervisors and/or principals. The rating card used included four categories to be evaluated: Personality, Preparation, Technique, and Pupil Reaction.

Under the category Personality were: physical characistics, emotional stability, social adjustment, professional relationships, judgment, and habits of conduct.

Listed under the category Preparation were found: professional attitude, technical knowledge and skill, continuity of professional growth, subject matter scholarship,

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[38]Ibid., p. 74.

[39]Daniel, The Measurement and Evaluation of Teaching, pp. 22-23.

language usage, civic responsibility, dependability, appreciation, and ideals.

The category entitled Technique included: planning and organization, individualization, classroom generalship, manipulation of materials, and ability to compromise.

Under the category Pupil Reaction were: enthusiasm, power to appraise, normal development, expression, subject matter progress, habits of thinking, habits of conduct, and attitudes.

The state of Hawaii[40] utilized a two-part form which considered both the conditions of work that affect teacher performance, and the teacher's professional qualities. In the first part, the teacher rated his or her classroom environment including: Students--their ability, stability of class enrollment and special problems related to the gifted, mentally retarded, physically handicapped, or emotionally disturbed; Availability of Instructional Materials such as books, workbooks, A-V aids; Physical Facilities such as furniture, lighting, ventilation, and storage; Teaching Load including number of periods, number of preparations, enrollment load, grade and committee meetings, special assignments, clerical work, and conferences; Teacher Placement, in accordance with training and experience; and those conditions affecting performance such as classroom

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[40] Ibid., pp. 30-31.

interruptions, community services, money-raising activities, and other special requests.

Part Two of the Hawaii rating form was completed by the principal and included the following nine areas to be evaluated: Knowledge of Subject Matter, Presentation of Material, Oral and Written Expression, Lesson Organization and Plans, Classroom Climate, Classroom Management, Attitudes and Working Relationships, Organization of School Details, and Professional Improvement.

The Florida rating form considered generally the same areas and listed:

(1) Personal qualifications--health and emotional stability, appearance, ability to think logically and make practical decisions, punctuality, accuracy, ability to take necessary and appropriate action and professional dedication.
(2) Relationships with others--respect by pupils, responsible and dependable, friendliness, understanding, in sympathy with community and other staff and administration.
(3) Teaching skills and ability--knowledge of subject matter, efforts to improve self, effective use of lesson plans and instructional materials, develops pupil interest. Maintains pupil control, uses material in pupil cumulative folders.[41]

The committee on IOTA of the California Teachers Association suggested that teachers' competencies be considered in terms of six "roles." Specific illustrations of what they considered role involvement included:

Role 1: Director of Learning
1.1 Adapts principles of child growth and development to planning of learning activities.

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[41] Daniel, The Measurement and Evaluation of Teaching, pp. 37.

1.2 Plans teacher-learning situations in accord with acceptable principles of learning.
1.3 Demonstrates effective instructional procedures.
1.4 Utilizes adequate evaluation procedures.
1.5 Maintains an effective balance of freedom and security in the classroom.

Role 2: Counselor and Guidance Worker
2.1 Utilizes effective procedures for collecting information about each pupil.
2.2 Uses diagnostic and remedial procedures effectively.
2.3 Helps the pupil to understand himself.
2.4 Works effectively with the specialized counseling services.

Role 3: Mediator of the Culture
3.1 Draws on a scholarly background to enrich cultural growth of pupils.
3.2 Directs individuals and groups to appropriate significant life application of classroom learning.
3.3 Designs classroom activities to develop pupil ability and motivation.
3.4 Directs pupils in learning to use those materials from which they will continue to learn after leaving school.
3.5 Develops pupil-attitudes and skills necessary for effective participation in a changing democratic society.
3.6 Helps his students acquire the values realized as ideals of democracy.

Role 4: Link with the Community
4.1 Utilizes available education resources of community in classroom procedures.
4.2 Secures cooperation of parents in school activities.
4.3 Assists lay groups in understanding modern education.
4.4 Participates in definition and solution of community problems.

Role 5: Member of the Staff
5.1 Contributes to the definition of the overall aims of the school.
5.2 Contributes to the development of a school program to achieve its objectives.
5.3 Contributes to the effectiveness of overall school activities.
5.4 Cooperates effectively in the evaluation of the school program.

Role 6: A Member of the Profession
6.1 Demonstrates an appreciation of the social importance of the program.

6.2 Contributes to the development of professional standards.
6.3 Contributes to the profession through its organizations.
6.4 Takes a personal responsibility for his own professional growth.
6.5 Acts on a systematic philosophy, critically adopted and consistently applied.[42]

Claude Fawcett[43] suggested an evaluation scheme of teachers in terms of their leadership role; that teachers should be evaluated in terms of how well they can facilitate, organize, and set goals, by how well they can specify means to achieve these goals, and their capability to evaluate the results of learning within their classrooms. He discussed several categories of leadership skills which would be acceptable to both teachers and administrators and offered the following as leadership skills:

I. Interpersonal Relations
   A. Teacher-Student
   B. Teacher-Teacher
   C. Teacher-Administrator
   D. Teacher-Parent
II. Classroom Management
   A. Goal-Setting
   B. Organization of Classwork
   C. Evaluation and Reward
   D. Authority
   E. Research
   F. Record-Keeping
   G. Instructional Coordination
   H. Communications
   I. Identification
   J. Efficient Utilization of Class Time

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[42] Bradley and others, Measuring Teaching Competence, passim, pp. 71-76.

[43] Claude W. Fawcett, "The Skills of Teaching" (Los Angeles: University of California at Los Angeles, May, 1965), pp. 1-2. (Mimeographed.)

III. Instructional Skills
   A. Learning Environment
   B. Tools and Materials of Learning
   C. Sequencing of Instruction
   D. Analysis of Learning Problems[44]

Louis Raths suggested a framework of twelve teaching functions "of great importance in every teaching day" and proposed them "not as a rating scale, but as a broad framework for teachers to discover more about themselves in relation to the functions of teaching."[45] These functions included:

1. Explaining, informing, showing how
2. Initiating, directing, administering
3. Unifying the group
4. Giving security
5. Clarifying attitudes, beliefs, problems
6. Diagnosing learning problems
7. Making curriculum materials
8. Evaluating, recording, reporting
9. Enriching community activities
10. Organizing and arranging classroom
11. Participating in school activities
12. Participating in professional and civic life.

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[44] Ibid., p. 8.

[45] Louis E. Raths, "What Is a Good Teacher," Studying Teaching, eds. James Raths, John Pancella, and J. S. Van Ness (Englewood Cliffs: Prentice-Hall, Inc., 1967), pp. 8-9.

Gray[46] listed a number of criteria for evaluating teacher performance and suggested that the teacher should: (1) make explicit the objectives of his course; (2) provide suggestions on how students can practice skills required for success in the course; (3) provide students with opportunities for feedback regarding their performance by means of various types of critiques; (4) provide organized expository presentations reflecting scholarship in the field and variable reference approaches; (5) encourage students to analyze the major assumptions of the course; (6) pace the workload; (7) use up-to-date course materials; (8) use evaluative instruments that are logically related to the course objectives; (9) provide a variety of opportunities for students to demonstrate their proficiencies; (10) be available for regular student conferences; (11) suggest activities to pursue a continued interest beyond course requirements; and (12) have his own performance rated by actual student or colleague observers.

In a study of the feasibility of teacher merit pay in North Carolina,[47] committees in three centers (Gastonia, Martin County, Rowan County) developed a list of criteria

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[46] Charles E. Gray, "The Teaching Model and Evaluation of Teaching Performance," Journal of Higher Education, XL (November, 1969), 636-42.

[47] North Carolina Department of Public Instruction, The North Carolina Teacher Merit Pay Study: A Report to the General Assembly (Raleigh: The North Carolina Department of Public Instruction, 1965), p. 105.

which were then applied in a pilot test of teacher evaluation. In each of the centers, it was felt that the criteria were fairly formulated, with cooperative input by teachers, principals, and supervisors, that they comprehensively described the characteristics of good teaching, and that they were applicable to almost all classroom situations.

In establishing evaluative criteria, a number of questions were asked by each committee, and attempts were made to elaborate the various behaviors being examined. The Gastonia group asked:

1. To what degree does the teacher organize learning experiences so that pupils understand purposes and procedures?
2. To what degree does the teacher recognize individual differences in pupils and attempt to meet their needs?
3. To what degree does the teacher maintain an emotional climate conducive to good discipline and learning?
4. To what degree does the teacher show professional skill in employing effective methods?
5. To what degree does the teacher show professional skill in motivating pupils?
6. To what degree does the teacher show professional skill in the use of evaluation?
7. To what degree does pupil reaction in the classroom show evidence of a good learning situation?[48]

The Martin County group focused on these questions:

1. To what degree does the teacher recognize and meet the individual needs of pupils?
2. To what degree does the teacher guide classroom procedures toward achievement of class purposes?
3. To what degree does the teacher show ability to evaluate the teaching situation and assist pupils in assessing their progress?

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[48] Ibid., p. 29.

4. To what degree does the teacher give encouragement and provide opportunities for pupils to make generalizations and relate concepts?
5. To what degree does the teacher motivate pupils to learn?
6. To what degree does the teacher contribute to a good emotional climate for learning?
7. To what degree do the pupils show positive reactions to the learning situation?[49]

The Rowan County group asked:

1. Is the teaching geared to meet the maturation level of the pupils?
2. Is there evidence that the teacher has a good understanding of purposes and methods in teaching?
3. Are pupil activities directed toward valid learning goals?
4. Are pupils made aware of their progress in the learning activity?
5. Is the behavior of the teacher conducive to keeping the classroom free from distorting anxieties?
6. Is the teaching situation characterized by positive pupil responses?[50]

Each of the above questions included a comprehensive number of sub-items to help observer-raters identify examples of each specific behavior being rated. These appeared in an interim report.[51]

In addition to being observed in the classroom, the North Carolina teachers were asked to provide personal

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[49] North Carolina Department of Public Instruction, The North Carolina Teacher Merit Pay Study: A Report to the General Assembly, p. 29.

[50] Ibid.

[51] North Carolina Department of Public Instruction, Progress Report to the 1963 General Assembly by the North Carolina Experimental Program of Teacher Merit Pay (Raleigh: The Department of Public Instruction, December, 1962), passim, pp. 21-22, 39-40.

information about their academic preparation, areas of specialization, levels of certification, positions held, professional and nonprofessional work experience, out-of-class activities including memberships and participation in professional organizations, professional writing, and special honors and distinctions.[52]

Alexander Mood, in a paper presented at the U. S. Office of Education Conference, suggested that performance indicators are more relevant than are education, certification, or experience. In terms of what might be measured, Mood listed five Abilities[53] which he felt should be brought under consideration:

1. Dedication to the Educability of all Children
2. Ability to Communicate
3. Ability to Motivate
4. Ability to Organize and Manage a Class
5. Ability to Create Learning Experiences.

Mood omitted a sixth area, related to the teacher's knowledge of subject matter, because he felt that acceptable instruments are already available to measure this aspect adequately.

The Illinois Elementary Principals group,[54] cited

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[52] Ibid., passim, pp. 23-25.

[53] Mood, "Do Teachers Make a Difference?" pp. 9-10.

[54] "Evaluation of the Instructional Program," passim, pp. 9-10.

earlier, developed an evaluation list which included factors for analysis of both the teacher and teaching. Teacher factors were listed as: Subject matter currency, Knowledge of theories of knowledge, Selection and use of materials, Awareness of human and public relations, Learning and discipline, Professionalism, and Mental and emotional maturity. Teaching factors included: Methods of instruction, Awareness of individual differences, Variety of procedures, Emphasis on concepts and generalizations, Consideration of individual readiness, Development of remedial approaches, Use of different approaches to problem-solving, Use of both individual and group activities, and Efforts to foster democratic attitudes.

Also included was concern for selection and use of various instructional materials such as their variety, spanning a sufficient range from concrete to abstract; their levels of interest, or whether they are geared to individual differences; their current suitability; and how well they reflect social realities.

Ronald G. Good evidenced particular concern for the teacher-student relationship and developed a series of questions an evaluator might utilize when assessing effectiveness:

1. Is the teacher genuinely interested in helping each student come to understand and accept his unique self?
2. Does the teacher perceive his students as basically trustworthy and dependable?
3. Does he communicate without ambiguity?
4. Are the children enjoying themselves in this teacher's classroom?

5. Is the atmosphere in the classroom free from threat as perceived by the students?
6. Does the teacher seem to accept each student as a worthwhile individual?
7. Does he have enough confidence in himself that he can tolerate ambiguity in the classroom? That is, are different students encouraged to pursue their interests? Is there evidence that the teacher will accept answers and methods that are different from his? Does he encourage divergent thinking? All of these questions refer to the tolerance of ambiguity.
8. Does the teacher assist and facilitate rather than control and manipulate?
9. Are the children personally involved in the class?
10. Does the teacher view each student as constantly in the process of becoming?
11. Are the teacher's perceptions about himself and about others accurate?
12. Does he have the desire to learn more, to constantly grow as a professional and as a person?
13. Is he secure enough as an individual to be open to different methods and ideas?
14. Is he able to sense the immediate needs and interests of his students and act effectively in accordance with these needs and interests?
15. Does he have enough confidence in his knowledge of subject matter so that his students have confidence in him?
16. Is the teacher more interested in the processes involved in learning or in the products reflected through factual evaluative techniques?
17. Do the students respect and care for the teacher as an acceptable adult figure?[55]

From a representative review, it is apparent that criteria offered for teacher evaluation tended to fall into several general categories, and included: competency in subject matter, effectiveness in instructional approaches and techniques, activities directed toward professional growth and development, and personal effectiveness. However,

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[55]Ronald G. Good, "Suggested Criteria for Teaching Effectiveness" (Chapel Hill: University of North Carolina, School of Education, 1968), p. 2. (Mimeographed.)

emphasis does vary, according to the particular interest of the individual or group, so that in one instance it might appear that subject matter and class management competencies are stressed more than human and interpersonal traits, while in another instance the reverse might appear more important.

Who Should Evaluate?

In considering approaches to evaluation, Cohen and Brawer[56] reviewed some of the more typical, including: supervisor ratings; rating by degrees held; considerations of the size and kinds of degree-granting institutions; rating by colleagues; and consideration of the number and kinds of publications and government awards. Of these, they felt that ratings by supervisors were most practical, and cited studies which indicated both positive and negative aspects of these approaches. As a result of their study, they felt that teaching performance could "be established by such media as supervisor ratings, tests, self and peer evaluations and observational techniques."[57] Cohen and Brawer suggested that the safest approach to appraisal of teaching is a multiple one "employing more than one theoretical orientation, a variety of data gathering devices, and . . . a

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[56]Cohen and Brawer, Measuring Faculty Performance, passim, pp. 9-11.

[57]Ibid., p. 4.

number of persons studying teachers and teaching under a variety of conditions."[58]

In the NEA Educational Research Service survey,[59] teachers were asked to suggest persons who should be responsible for the task of evaluating teachers. Over 96 percent said this should be done by the principal, with fewer than 1 percent stating that this should be a task of the supervisor, departmental chairman, or other teachers.

In more than one half of the systems responding to the NEA study, the principal was the sole evaluator of teachers. In some systems he was helped by an assistant, department head, or supervisor in preparing a single evaluation form while in others the principal and at least one other person prepared separate forms.[60]

Bolton felt that evaluations should derive from the pooled judgments of experts and, in support of this he discussed Ryans' ideas of how such a group of experts might be constituted. He suggested that they may be drawn from one of the following:

1. The Totality of the known group of authorities or experts (e.g. all of the principals and supervisors in the school district, all members of a teachers'

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[58] Ibid., p. 8.

[59] "Evaluation of Teaching Competence," p. 71.

[60] Ibid., p. 67.

professional organization, all college teachers of a specified subject matter, etc.). Of course, such a procedure usually is not feasible unless the totality of experts is relatively small.

2. A random sample from the roster of membership lists of a known group of authorities.
3. A purposive sample drawn from the totality of authorities as defined.
4. A sample of individuals who have been specially trained to make authoritative judgments regarding the criterion.[61]

In expressing beliefs about practices of teacher education and certification, Conant[62] recommended that persons from State Departments of Education, professors of education and other subject matter areas, supervisors of student teaching, and local public school administrators be involved in the evaluation process. Mastery of subject matter, application of educational understandings, methods of teaching techniques, and certain personal and intellectual attributes should be included as areas of evaluation.

The AAAS Committee[63] indicated their feeling that professional organizations should also be involved in co-operative research and the development of projects leading to establishment of science teaching competencies.

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[61] Dale L. Bolton, Developing Criteria for Teacher Evaluation, U. S. Department of Health, Education and Welfare, Office of Education, Prep Report 21-E (Washington: National Center for Educational Communications, 1971), pp. 2-3.

[62] James B. Conant, The Education of American Teachers (New York: McGraw-Hill Book Company, 1963), p. 62.

[63] AAAS, Guidelines and Standards, pp. 52-53.

In a study to test the use of judgments of teacher competence in classroom performance, as a potential basis for teacher certification, Bob Burton Brown[64] demonstrated and evaluated a number of ways in which both academic and education professors, supervisors of student teaching, co-operating public school administrators, and State Department of Public Instruction personnel may be brought together to observe classroom teaching performances and to judge competence for teaching.

The main purpose of the Brown study was to discover some of the factors which must be considered in determining "who is a good teacher," "who is a good observer-judge of teacher competence," and "what is a good procedure for making observations and evaluations of teacher competence."[65] As a result of the study, he[66] suggested that a variety of observational instruments be used, representing a "cross-section" of differing educational philosophies, that a number of different observer-judges representing differing educational beliefs or philosophies be involved, and that a number of observations be made by each of these different judges, using different observational systems.

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[64]Bob Burton Brown, An Investigation of Observer--Judge Ratings of Teacher Competence (Tallahassee: University of Florida, 1969), p. 1. (Hereinafter cited as Brown, An Investigation of Observer.)

[65]Ibid., p. 87.

[66]Ibid., pp. 95-96.

Although it is apparent that evaluation of the individual teacher is usually conducted by a single supervisory or administrative superordinate, the literature suggested that evaluations be a cooperative effort and that teams of evaluators be formed to include persons representing various facets of the educational and professional structure. In this way the special interests and concerns of various individuals and groups will be represented and a broader base of competencies can be evaluated.

Rater Bias

Another aspect of problems related to evaluations of teacher effectiveness derives from concerns about the validity of evaluator judgments. In the Illinois report, cited earlier, it is suggested that prior to attempts to evaluate teachers, it may be well to find answers to the following questions:

1. To what extent is the teacher's effectiveness related to the attitudes of his immediate supervisor?
2. To what extent is the teacher's effectiveness related to the sociological as well as the physical characteristics of the community?
3. To what extent is the teacher's effectiveness related to the children with whom he works?
4. To what extent is the teacher's effectiveness related to the physical plant and its instructional equipment?
5. To what extent is the teacher's effectiveness related to the educational philosophy prevalent in the school in which he serves?[67]

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[67] Illinois Elementary School Principals' Association, "Evaluation of the Instructional Program," p. 7.

Of particular concern as it related to the evaluation of a teacher by others in the system are the biases inherent or implied in the above statements. In what ways do these "attitudes," "characteristics," and "philosophies" affect a particular evaluation or rating?

In a recent article in the Phi Delta Kappa journal, Allen Ornstein expressed concerns about bias due to varying perceptions of different "types" of judges and stated that:

> Teacher behavior concepts and definitions have different meanings among different groups of subjects--for example, students, teachers, supervisors--in part because of their different roles . . . moreover, this is true even within the same group of subjects. . . . As a result, these concepts and definitions vary among the different investigators, too, even though they often attempt some kind of acceptable validity.[68]

Also having concerns for rater bias, Donald Musella[69] in his study asked the question, "How sure are we that the judgment and decision of the rater are based on the stated criteria?" He found that rating, defined as including "all the physiological processes that go into the final outcome," is a function, in part, of the perceptual-cognitive style of the individual rater.

Musella[70] believed that research has not provided any useful criteria for measuring and evaluating teacher

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[68] Ornstein, "Systematizing Teacher Behavior," pp. 553-54.

[69] Donald Musella, "Improving Teacher Evaluation," Journal of Teacher Education, XXI (Spring, 1970), 18-19.

[70] Ibid., p. 18.

effectiveness and that no significant evidence exists except the consistent lack of agreement between ratings done by supervisors, fellow teachers, students, and teacher-training "specialists." This he felt occurred "because of the subjectivity involved in rating due to variables related to the personal characteristics of raters."[71] He summarized by saying that "decision-making in the school setting must continue to rely on experience-based intuitive predictions and assessments that constitute the best judgements at the time."[72]

Cohen and Brawer in their study expressed concerns for rater bias and concluded that:

> People see different people in various lights: One may project his own values and problems upon the assessed without being aware of them. Therefore, any individual who examines evaluations of performance (often based upon unspecified criteria) must also look at the rater to decide from what viewpoint he assesses his subjects. To some extent, this problem may be countered by erecting objective criteria; even so, individual biases persist and while they may add flavor to assessment, they may also interfere with it.[73]

In a study to determine the applicability of elementary and secondary school teacher ratings assigned by principals, K. Fred Daniel[74] assumed that the rating which a teacher

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[71] Ibid.

[72] Ibid., p. 15.

[73] Cohen and Brawer, Measuring Faculty Performance, p. 7.

[74] K. Fred Daniel, "A Catalog of Analysis of Variance Pilot Studies Employing Data from the Official Florida

receives is a function of (a) the status of the qualities or traits he possesses, (b) the situation(s) in which he was observed, (c) the status of the qualities or traits of the evaluator (i.e., his biases), and (d) interaction among (a), (b), and (c). His results indicated that the only factor which consistently affected variance is the evaluator. In his words, "differences in evaluation practices of individual raters is the primary factor to which differences in ratings assigned teachers can be attributed."[75]

In exploring factors relating to the appraisal of student teachers by university supervisors, Cicirelli found a similar situation and concluded that:

> Obviously, any assessments and recommendations made by a university supervisor will vary depending upon the particular student teacher and situation observed, but it seems equally apparent that the university supervisor brings to the observation situation a uniquely personal set of standards or criteria of good teaching (whether overt or implicit) upon which he bases his assessments and recommendations. He may perceive those things in the student teachers performance which he is selectively set to perceive and ignore certain other factors which a different supervisor with different standards might consider important.[76]

In his study of educational attitudes and perceptions

Teacher Evaluation Form" (Tallahassee: Florida State Department of Education, 1966), p. 1. (Mimeographed.)

[75]Ibid., p. 2.

[76]Victor G. Cicirelli, "University Supervisors' Creative Ability and Their Appraisal of Student Teacher Classroom Performance: An Exploratory Study," The Journal of Educational Research, LXII (April, 1969), 375.

of desirable teacher traits, Kerlinger and Pedhazur[77] found that "Progressivism" and "Traditionalism" were the two fundamental bases from which attitudes are developed about teacher traits. In a test of the hypothesis that judges' perceptions are influenced by their philosophical base, they found that those having a "progressive" attitude tended to perceive "person-oriented" traits as most desirable; while those with a "traditionalist" base felt that "task-oriented" traits were most desirable.

In considering effects of bias on the part of administrator-raters, Madden contended that these result from a normal, strong ego-structure, and because he felt that administrators as a group probably have stronger than average ego-structures and thus tend to judge teachers in terms of the kind of teacher the rater was or thinks he was, he should be "especially vigilant against the tendency to cast his image of a good teacher in his own likeness."[78]

Using degree of belief in Dewey's philosophy of experimentalism as the base for observation, Brown[79]

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[77]Fred Kerlinger and Elazur Pedhazur, "Educational Attitudes and Perceptions of Desirable Traits of Teachers" (paper read at the Annual Meeting of the American Educational Research Association, February, 1967, New York City, New York).

[78]Madden, "Teacher Selection--How to Weed Out the Duds," p. 4.

[79]Brown, An Investigation of Observer, passim, pp. 59-93.

described a study in which teachers were evaluated according to how closely the observer felt the teacher's behavior was "pro-Dewey," and this evaluation was correlated with the observer's philosophic position. The results of this study indicated that observers indeed differ in their evaluations, that their observations are subjective and related to their personal philosophic orientation. Also, he found that often there is a gap between educational theory and practice, that a teacher's beliefs do influence both observational descriptions and evaluative ratings, and that judges associated with public schools tend to observe more "experimental teaching" than do judges from colleges and universities.

In the Brown study, cited earlier, no effort was made to eliminate differences which appeared among observers. Instead, they were taken as they came from groups normally associated with teacher training, and were given only brief instructions regarding use of the instruments. Brown said that "no efforts were made to improve reliability or validity of observations and evaluations."[80] One of the general objectives, of his study was to provide descriptive information about the observer-judge ratings of teacher competence, including "the identification of factors influencing their reliability and validity, as well as the

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[80] Ibid., p. 87.

variation and central tendencies of their observations and evaluations."[81]

Brown stated that according to his study, "teacher evaluation is relative to the complex interaction of many factors, including beliefs of both the teacher and observer-judges, observations of classroom behavior, age, sex, experience, grade level, and subject taught."[82] He also felt that it is not possible to attain complete objectivity in getting descriptions of classroom teaching behavior and stated that, "it is essential to identify the beliefs of observers which influence the observations of behavior in order to take them into account in interpretation."[83] He did not believe, however, that observer-judge bias need be eliminated but did state that "if evaluation of teaching competence is to be fair, the legitimate and legal differences of opinion or belief with respect to educational purposes or philosophy should be permitted and provided for, within the evaluative process."[84]

In another study using the Teachers Practices Observation Record (TPOR) Brown stated that "no attempt was made

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[81] Brown, An Investigation of Observer, p. 2.

[82] Ibid., p. 94.

[83] Ibid., p. 95.

[84] Ibid., p. 96.

to train the observers. To the contrary, we deliberately tried to preserve the differences among observers by selecting them from varying occupational groups, from varying sizes of institutions with varying orientations to teacher education, and from varying parts of the country."[85] He contended that reliability coefficients that favor a high degree of agreement between observers "implies that we should seek a single, uniform objective system for observing and classifying teaching behavior";[86] "between-observer" agreement may not only encourage a false sense of confidence with respect to the accuracy of measurements, but also gives us a false sense of "objectivity" regarding the observations."[87]

Rabinowitz and Travers in discussing the problems of evaluating teacher effectiveness felt that there are no objective means for identifying criteria as being either acceptable or unacceptable. They felt that the terms "effective" or "ineffective" imply value judgments and they stated that "no teacher is more effective than another except

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[85] Bob Burton Brown, William Mendenhall, and Robert Beaver, "The Reliability of Observations of Teacher Classroom Behavior," U. S. Office of Education, Department of Health, Education, and Welfare (Washington: National Center for Educational Communications, 1967), pp. 17-18. (Mimeographed.)

[86] Ibid., p. 18.

[87] Ibid., p. 19.

as someone so decides and designates. . . . The ultimate definition of the effective teacher does not involve discovery but decree."[88]

Ryans'[89] position agreed with that of Rabinowitz and Travers' and he believed that no criterion of effective teaching is "good" in or of itself but rather, the worth of any set of criteria is established by the values held by the group to which the teaching is directed. Also, Ryans found that different observers perceive and respond differently, even when simultaneously observing the same teaching act. This he felt was due to differences in the value systems of the observers.

In their publication, Who's a Good Teacher? the American Association of School Administrators stated that:

> There is no way to discover the characteristics which distinguish effective and ineffective teachers unless one has or is prepared to make a value judgment." . . . and that the effective teacher does no exist pure and serene, available for scientific scrutiny, but is instead, a fiction in the mind of men.[90]

Because of problems encountered in developing

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[88] William Rabinowitz and Robert Travers, "Problems of Defining and Assessing Teacher Effectiveness," Educational Theory, III (July, 1953), 212.

[89] David G. Ryans, Characteristics of Teachers: Their Description, Comparison and Appraisal (Washington: American Council on Education, 1960), p. 16.

[90] Ellena, Stevenson, and Webb, Who's a Good Teacher? p. 37.

suitable criterion variables, Sorenson and Gross[91] concluded that attempts to predict teacher effectiveness had reached a dead end. In their analysis, they found that most investigators had "either explicitly or implicitly assumed the existence of some single set of behaviors or traits that characterize the good teacher, and further, made the assumption that these behaviors apply and can be observed by any school administrator or supervisor who is worth his salt."[92]

In an effort to develop more useful ways of selecting and appraising teachers, Sorenson and Gross[93] suggested that one should not assume a single set of educational objectives, but should instead accept the fact that teacher assessment is subjective, that different observers will have different expectations, and that a "good teacher" is relative to the values and expectations of the evaluator. They stated that "the first step in predicting teacher effectiveness is to spell out the nature of the role expectations which determine the responses of teacher evaluators."[94] If this were done, "the relationship between the teacher role expectations of observers and their observations or ratings of

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[91] Garth Sorenson and Cecily F. Gross, Teacher Appraisal, a Matching Process (Los Angeles: UCLA Center for the Study of Evaluation of Instructional Programs, 1961), p. 1.

[92] Ibid., p. 2.

[93] Ibid., p. 3.

[94] Ibid.

teacher behavior could be systematically examined," and "it might then be possible to predict which teachers a given observer would approve and which he would disapprove."[95]

A major conclusion derived from their study was that "teacher assessment is essentially subjective, and two observers with different expectations will inevitably disagree about the goodness of any individual whom they are judging."[96]

In summary, regarding rater bias, the literature revealed that it appears almost impossible to be both "objective" and "fair" when evaluating teachers. Each evaluator or judge of teacher effectiveness or competence will likely bring into the evaluation process his own unique set of biases, due to differing value systems, philosophical outlooks, personal "intuitive judgments," "ego structure," and role expectations.

In practice, how do all of these factors interact in an actual program of biology teacher evaluation?

Evaluation of Biology Teachers

How are biology teachers evaluated? Review of the literature revealed that with one apparent exception, evaluation of biology teachers evidently is similar to the

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[95] Ibid.

[96] Ibid., p. 2.

evaluation of teachers of any other subject, with periodic review of performance based on criteria applicable to teachers and teaching generally. However, the exception mentioned is a notable one, and consists of a highly structured and quite formal effort of one of the professional teaching organizations, the National Association of Biology Teachers (NABT), to identify and honor good biology teachers and teaching.

In 1961, NABT initiated the Outstanding Biology Teacher Award program (OBTA), and since that time has selected more than four hundred biology teachers for recognition as outstanding biology teachers.

Realizing that there would be concerns for the identification and selection of criteria, and for the identification and selection of judges of biology teachers in such a program of evaluation, the original committee formed to design the program assumed that there was no universally accepted standard set of criteria which could be used for the evaluation of good teaching. Further, in order to ensure adequate evaluative procedures, they decided that "the best judges of outstanding teaching should be from diverse backgrounds and regionally oriented, and should use as much evidence as is possible from records, recommendations, and in visits to the site of the candidate."[97]

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[97] Paul Klinge, "In Defense of the Recognition of Merit," The American Biology Teacher, XXVII (December, 1965), 748.

Adhering to this view, evaluation and selection committees of the OBTA program presently consist of: secondary school persons, both administrative and instructional; professional biologists, in research, teaching, and industry; and others having appropriate contact with biology teachers and teaching such as professors of science education and state science supervisors. Separate selection committees and individual awards exist for each of the fifty states, the District of Columbia, and Puerto Rico.

What do these persons look for when evaluating candidates for this award? Examinations of materials available from the Association revealed that NABT apparently is in agreement with most other groups and offers members of selection committees a set of forms which contain criteria categories similar to those cited earlier in the chapter. OBTA forms available for use include: Nomination and Recommendation Form and A Candidate Record Form which contain detailed personal data including a philosophical essay from each candidate. Copies of these forms are found in Appendix E. Also available to committee members is an Evaluation of Qualifying Experiences Form which they can use when quantifying data found in the previous two forms, and a Detailed Evaluation of Teaching Observed Form for their use when rating candidates visited in the classroom.

On the Nomination and Recommendation Form, directions to persons who nominate or who recommend candidates for the

award state that the form should be "completed only by a person in the education profession qualified to judge the teaching effectiveness of the candidate,"[98] or if by someone not in the education profession, "by a person uniquely qualified to know of the teaching effectiveness of the candidate."[99] Further, it is suggested that statements by the recommending person be specific and that particular examples to support general statements such as "has good work habits," or "is an excellent teacher,"[100] be included in the nomination or recommendation statements.

Areas suggested for consideration in the Nomination and Recommendation Form include: Teaching Ability, Cooperativeness, Inventiveness, and Initiative, and space is provided on the form for additional comments about what the person who is nominating or recommending feels to be the principal strengths and weaknesses of the candidate. Specific directions about what to consider for rating on this form include:

1. Teaching ability: What techniques does this teacher employ? Is his course comprehensive yet enjoyed by students? Does he enjoy teaching?
2. Cooperativeness: How does the teacher cooperate in

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[98] National Association of Biology Teachers, "OBTA Nomination-Recommendation Form" (Washington: The Association, 1969), p. 1. (Mimeo-printed.)

[99] Ibid.

[100] Ibid.

the school program or other academic areas? Co-operative in community affairs?

3. Inventiveness: What new ideas does he use, or has produced, in teaching? What new devices?
4. Initiative: Has failure stopped him? Does he adapt his methods to new situations?[101]

Nomination and recommendation forms are available to members of state selection committees for their use in screening candidates, for selecting finalists, and for making decisions about who should receive the award.

Also available to each state's selection committee is a somewhat comprehensive and personal Candidate Record Form, provided them by each candidate, which includes information about:

Name, date of birth, name and address of school, residential address
Publications in professional or scientific journals
The professional and scientific journals read regularly
Memberships in professional, scientific, or educational organizations (local, state, National)
Offices, committee assignments, or program duties held in the above organizations
Involvement in other pertinent school or community activities
Scholarships, awards and honors received
Education record (including institutes, special programs, etc.)
Colleges or universities attended, dates, degrees received, and degree fields
Positions held (professional, teaching, administrative)--where held, when held, number of biology classes taught per day
Types of teacher certification

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[101] Ibid., p. 2.

Other pertinent information (programs, courses initiated, unusual teaching procedures, etc.)[102]

This form includes a section for information about the academic preparation of the candidates: they are asked to list courses taken in college, course numbers, titles of courses, years when courses were taken, number of semester hours earned, and grades received.[103] Major discipline areas include the biological sciences, education, mathematics, chemistry, physics, and the earth sciences. The final page of the form is to be used for a brief essay by the candidate with directions stating that this should include "a short discussion of your teaching philosophy and the role of biology in general education."[104]

Information found in the Candidates Record Form is rated according to the items suggested on an Evaluation of Qualifying Experiences,[105] form. This form includes:

1. Academic Preparation:
   - In general education
   - In physical sciences
   - In biological sciences
   - In graduate work
2. Teaching Experience:
   - In science
   - In biology
3. Related Professional Experience:

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[102] National Association of Biology Teachers, "Candidates Record Form" (Washington: The Association, 1969), pp. 1-2.

[103] Ibid., p. 3.

[104] Ibid., p. 4.

[105] National Association of Biology Teachers, "Evaluation of Qualifying Experiences Form" (Washington: The Association, 1969), p. 1.

Head of science department with responsibility for: coordinating biology instruction with other science areas
Conducting science clubs, seminars, congresses
Preparing curricular and/or audiovisual materials
Consultant (trainer for other teachers in workshops)
Writing professional or technological materials for publication

4. Related Work or Travel Experiences:
   Summer experiences related to biological sciences:
   In research
   In business or industry
   Summer travel with biological emphasis:
   To study
   To observe
5. Memberships and Honors:
   Holds membership in professional organizations
   Holds elective offices in these organizations
   Reads professional journals regularly
6. Evaluation of Teaching Philosophy as Per Individual Essay.

From analysis of the Nomination and Recommendation Form and the Candidate Record Form, each state committee is directed to select the top three to five candidates on the basis of the completed form, "and then, visit these three to five candidates in their teaching situations."[106]

For this phase of the program, members of state selection committees can use another form, Detailed Evaluation of Teaching Observed,[107] for their on-site evaluation and

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[106] National Association of Biology Teachers, "Organizational Plan for an Outstanding Biology Teacher Award Program" (Washington: The Association, 1969), p. 2. (Mimeographed.)

[107] National Association of Biology Teachers, "Detailed

analysis of the teaching of the candidate being visited.

This form considers a number of areas, and includes:

1. Personality
   - Displayed emotional balance and self-confidence
   - Presented a neat appearance and dressed appropriately
   - Displayed the enthusiasm and vitality requisite to effective teaching
   - Voice and mannerisms contributed positively to the presentation of material
   - Exhibited leadership in determining the tone of classroom activities
   - Created a relationship with the pupils that was friendly
   - Displayed interest and enthusiasm toward the subject taught
   - Evidenced a genuine interest in the pupils
2. Teaching Procedures
   - Exhibited ability to plan and to organize
   - Handled material so as to provide for the peculiarities of the class and individuals
   - Created situations that led to increased pupil responsibility and confidence
   - Understood and used audio-visual aids wisely
   - Showed neither bias nor favoritism toward particular pupils
   - Provides for learning of basic principles through first-hand experience
   - Provided for laboratories characterized by thought provoking problems
   - Provided for time and opportunities to define and delineate problems
   - Encouraged student to propose and discuss hypotheses
3. Adequacy of Knowledge of Subject
   - Evidenced command of suitable and correct language for the level taught
   - Demonstrated skill in making assignments definite and meaningful
   - Exhibited breadth and depth of knowledge
   - Demonstrated a sense of proportion for what was important

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Evaluation of Teaching Observed Form" (Washington: The Association, 1969), p. 1. (Mimeographed.)

Exhibited ability to translate knowledge into meaningful activities

4. Proficiency with Skills in Science
   - Makes provision for independent research work for talented students
   - Encourages first-hand observational work
   - Students allowed to design, set up, and carry out controlled experiments
   - Pupils have opportunity to collect and interpret data
   - Spirit of inquiring pervades

5. Class and Classroom Management
   - Dispatched routine promptly and smoothly
   - Was quick to sense and mature in handling control problems
   - Maintained order through effective teaching
   - Was conscious of and provided for the physical comfort of the pupils.

Although both the Evaluation of Qualifying Experiences form and the Detailed Evaluation of Teaching Observed form are available to members of state selection committees, use of these forms is optional. However, NABT is concerned about the application of rating criteria and in a memorandum[108] to chairmen of 1969-70 state selection committees, the national director of the program asked that if the two forms were not used, that objective rating criteria of their own be established, and that such criteria be included in the folders of the top finalists in the state. He also recommended discretion in the use of any rating scale and asked that state directors ensure that teachers being rated not see their individual forms.

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[108] William L. Brisby, "Memorandum to 1970 State OBTA Chairmen" (Washington: The Association, September, 1969), p. 2. (Mimeographed.)

Although these forms appear to be fairly specific in listing areas, traits, and behaviors of teachers which might be utilized as criteria for evaluation, it appears that there is still concern about the appropriateness of such criteria and of procedures of selection. In his annual report to the 1969 NABT Board of Directors, the national director of the OBTA program said that, "There is also a need for the national director and the regional directors to bring forth a more concrete philosophy upon which the awards should be made, as there seems to be a tremendous variance in the reasons for the selection of the state recipients."[109]

Apparently, this concern for criteria and their use is not new but merely an extension of a continuing one. During the fourth year of the program, NABT decided to make a careful review of the OBTA program. This decision was based in part upon persistent "requests for certain selection criteria,"[110] and resulted in a survey in 1965 of persons involved in the program for the preceding four years. These persons were asked to comment on "the operation of the program, its defects, its values, and its impact

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[109] William L. Brisby, "Report of the Director of the Outstanding Biology Teacher Award Program to the Board of Directors" (Washington: The Association, July, 1969), p. 70.

[110] Robert E. Yager, "Memorandum to OBTA State Directors" (Washington: The Association, November, 1963), p. 2. (Mimeographed.)

upon biological education."[111] Analysis of responses received,[112] revealed concerns about various aspects of administration, selection procedures, and the acceptance of the program by the profession and public.

Of particular interest were the concerns about (1) criteria--what they were and how they were used in the selection process, and (2) the possibility of finding common elements that characterize good teachers and teaching. Most respondents felt, however, that regardless of probable variance in the criteria used in the conduct of individual state procedures, the program was worthwhile and that the biology teachers selected did represent the best of the profession.

Regarding the evaluation of biology teachers, then, except for the format of the Outstanding Biology Teacher Award program of the National Association of Biology Teachers, it is apparent that they are not usually judged differently from teachers of other subjects. The OBTA program is a major exception and does seem to make provision for the major concerns expressed by those having interest in the evaluation of teachers.

As a professional teaching organization, the National

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[111] Based on personal correspondence between Dr. Robert E. Yager, Director of the National Association of Biology Teachers Outstanding Biology Teacher Award Program and the writer.

[112] Robert E. Yager, "Compilation of Responses to Request for Evaluation of OBTA" (Iowa City: State University of Iowa, 1965). (Mimeographed.)

Association of Biology Teachers quite logically assumes responsibility for the evaluation of teachers of biology. As a group having primary concern for the teaching of biology, such evaluation focuses on the evaluation of the person as a teacher, rather than just on his competence as a biologist.

Although the Association realizes that individual teams likely employ their own criteria when evaluating candidates, the materials provided to them by the Associations do appear similar to many of those utilized by others involved in teacher evaluation and likely influence the judging process.

However because the Association recognizes that teaching requires more than just competence with subject matter, members of evaluation teams represent various facets of the educational community. Evaluation is a cooperative effort and opportunity is provided for expression of the various special interests, outlooks, and biases of various individuals and groups.

If, as suggested in the Sorenson and Gross study that "we cannot assume that the 'good teacher' is something 'real' out there, but rather is relative to the values, expectations, and perceptions of the person evaluating him,"[113] and, if as they suggest, what needs to be predicted is "not the

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[113] Sorenson and Gross, Teacher Appraisal, a Matching Process, p. 3.

way an individual behaves as a teacher, but the way his behavior will be seen by the particular persons evaluating him,"[114] then perhaps it is worthwhile to determine what different "types" of persons look for when evaluating biology teachers.

Who are the persons serving on State OBTA Section Committees? What is their relationship to the field of biology teaching? Can the evaluative criteria they actually employ be identified? If so, do such criteria differ in value to different judges? Is there a value-hierarchy of criteria? To get answers to these questions was the purpose of this study.

Summary

The literature revealed that there is little argument about the necessity for the evaluation of teachers. However, it appeared that evaluation is conducted to satisfy a variety of needs and that differences often exist between the purposes of those claiming the right to evaluate. Because of these differences, a number of problems exist which interact in and affect the evaluation process.

Some of these problems derived from differences of opinion about the definitions of terms used, and from disagreements regarding the validity of observations and

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[114] Ibid.

interpretation of investigative data. Other and perhaps more major concerns related to the identification and use of suitable evaluative criteria, to the competency of the judges, and to the bias effects introduced into evaluation by judges having different perceptions about the teacher's role. To provide for these differences and to allow for evaluation of a wider base of competencies, the literature suggested that evaluation be a cooperative effort, utilizing teams of persons representing various aspects of educational and professional outlooks.

Criteria which were identified may be grouped into several distinct categories to include those which related to:

1. Competencies with subject matter
2. Effectiveness in instructional approaches and techniques
3. Activities directed toward professional growth and development
4. Personal effectiveness with others.

Although the literature is not extensive, it appears that criteria applied to biology teachers are not very much different from those used to evaluate teachers of other subjects. However, review of the procedures and materials used by the National Association of Biology Teachers in their Outstanding Biology Teacher Award program revealed that the Association is aware of difficulties with the

selection of criteria and with the biases of evaluators and attempts to provide for both of these concerns. Evaluation teams are composed of scientists in both schools and community, science educators, secondary school teachers, administrators and supervisors, and the evaluation process appears to be a cooperative effort. Although it seems that the criteria utilized might not be unique to biology teachers, the Association does not require that specific criteria be applied and opportunity is provided for the interplay of the various special interests, outlooks, and biases of those who judge.

CHAPTER III

METHOD OF INVESTIGATION

Review of the literature revealed that there are several basic concerns which are derived from studies of teacher evaluation. These included: (1) identification of suitable criteria for use by evaluators; (2) concerns about who should do the evaluating; and (3) concerns about rater bias, i.e., how the occupational status or role expectation of a particular judge causes him to value criteria differently from another judge.

Applying these concerns to considerations of the evaluation of biology teachers, this study attempted (1) to identify the criteria which various types of judges might use when evaluating biology teachers, (2) to determine if these criteria are valued differently by those in different judge-groups, and (3) to determine the relative importance of the various criteria found to be significant in the evaluation of biology teachers.

The decision to use the Outstanding Biology Teacher Award program (OBTA) of the National Association of Biology Teachers (NABT) as a source of data was made for a number of compelling reasons. In addition to being the only such program of formal evaluation of biology teachers currently

in the United States, the structure of the program was such that (a) it was national in scope and data could be gathered which could be treated either regionally or nationally, (b) the program was extensive enough to provide an adequate sample of data, (c) evaluators operated in mixed teams representing diverse occupational types with no effort made to "train out" differences between judge-groups, (d) the program did not offer a required set of criteria to be used by evaluators, and (e) the Association was willing for program data to be utilized.

Hypotheses Tested

Travers stated that hypotheses "are simply statements of some of the consequences that can be expected of a theory if it is true,"[1] and that for research purposes, "it is common to formulate hypotheses in a form known as the null hypotheses."[2] He went on to say that "in this form, the hypothesis states that no difference is expected"[3] and that because:

> The testing of the hypothesis from the data involves the determination of the probability that such a difference or greater would occur by chance, there is a certain logic in stating all hypotheses in the null form.[4]

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[1]Robert M. W. Travers, An Introduction to Educational Research (3d ed.; New York: The Macmillan Company, 1969), p. 12.

[2]Ibid., p. 314.

[3]Ibid.

[4]Ibid., pp. 314-15.

Statistical procedures used to test null hypotheses "provide an estimate of the probability that a particular difference could have occurred as a result of variations produced by chance circumstances,"[5] thus, use of appropriate statistical techniques provide a means by which to accept or reject a null hypothesis:

Data developed by the study were analyzed to test the following null hypotheses:

Ho 1: There is no significant difference in the ways that judges rate individual criteria which are used for both the pre-selection and final evaluation phases of biology teacher evaluation.

Ho 2: There is no significant difference between the rating levels assigned by judges to the criteria used in evaluation of biology teachers.

Ho 3: There is no significant difference in the ways that criteria used in the evaluation of biology teachers are rated between members of different judge-groups.

The Population Studied

With the support of the national office of the Association, and using materials provided by the director of OBTA, the names, addresses, and occupational status of individual members of the 1970 award program selection committees were obtained. Analysis of this material revealed a total of two hundred twenty individual judges.

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[5] Ibid., p. 315.

From the fifty states, and Puerto Rico and the District of Columbia, a total of forty-seven separate programs were represented. States not participating in the 1970 program Connecticut, Minnesota, New Hampshire, New York, and West Virginia. A list of selection committee members is found in Appendix A.

Isolating Criteria and Designing the Questionnaire

Through review of the literature and of the materials used by OBTA selection committees, a listing of the various kinds of competencies, experiences, traits, and behaviors which might be used as criteria during the OBTA evaluative processes were developed.

These items were grouped into categories and included: items which might be derived from comments on the OBTA nomination and recommendation forms; items related to the academic background of candidates; items related to teaching and other experiences; items related to professional activities and accomplishments; items related to school and community relationships; and items related to teacher, subject, and student relationships.

Using these items, a preliminary form of the questionnaire was developed and was sent, along with an abbreviated summary of the study plans, to a review panel for their comments and suggestions for revision. Panel members were selected according to their involvement in biology education

and for their familiarity with the OBTA program of teacher evaluation. Included in the review panel were professors of science education, secondary school biology teachers, college biology professors, and executives of NABT. Many had professional experiences at several levels of education, including both public and private schools, and possessed both administrative and supervisory experiences. A list of members of the review panel and a copy of the letter requesting their aid are found in Appendixes B and C.

Responses from the review panel were studied and appropriate modifications were made to the questionnaire. The final form of the questionnaire contained six categories of criteria and a total of one hundred eleven items. Space was provided for respondents to list additional items of importance to them and not already included in the questionnaire. A copy of the finalized version of the questionnaire is found in Appendix D.

Eliciting the Response

Individual letters and questionnaires were sent to each of the two hundred twenty OBTA selection committee members, immediately following notification to the Association of their completion of the selection process in their state. Self-addressed and stamped envelopes were coded to facilitate adequate recording of returns and to allow better control for a follow-up mailing. Copies of the initial and follow-up letters to selection committee members are found in Appendix C.

Directions regarding the rating of items of the questionnaire required that selection committee members rate each item twice, according to its importance to them when used for, (1) the pre-screening and (2) final evaluation phases. In this way it was hoped to determine if some criteria might be generally more useful than others in making preliminary decisions about teacher competence. In rating each item, selection committee members were asked to use the following rating-level scale:

1. Not important
2. Rarely important
3. Sometimes important
4. Usually important
5. Always important
N. Not applicable

A sixth rating, "N," was available for judges to indicate when criteria did not apply.

In addition to rating each item, they were asked to provide information about: the number of years they had served as a member of selection committees; their current position; whether they personally visited nominees or finalists in their classrooms; and if not, whether information related to candidate competencies with subject matter, student relationships, and classroom organization was available from personal acquaintance or other sources.

Treatment of Data

Because it was desired to ascertain the number of responses falling within each of the five rating-levels

for each item, and in order to be able to compare these responses between judge-groups, ratings for each item were tallied. In order to determine whether the differences between judge-groups represented differences due to reasons other than chance, chi square analyses were computed for:

1. The responses derived for each rating-level, within each separate judge-group;
2. The responses for each rating-level between each separate judge-group; and
3. The two responses given for each item rated both for the pre-screening and final evaluation phases.

In a chi square analysis it would be expected that, by chance alone, one fifth of the responses for each item would appear in each of the five rating-levels. The "N" category can be excluded as it provided only data about whether a criterion did not apply. The degree of variance between expected and observed frequencies within each rating-level provided a measure of statistical significance.

Expected and observed frequencies of responses for each item, and between the responses of separate judge-groups were analyzed by the following formula as expressed by Siegel:

$$x^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i}$$

O_i = Observed responses found in the i th category.

E_i = The number of responses expected in the i th category under Ho.

$\sum_{i=1}^{k}$ = Summation over all (k) categories.[6]

If the difference between the responses expected and the responses actually observed was small, the value of x^2 was also small. If the difference was great, x^2 was large. According to Siegel, "the larger x^2 is, the more likely it is that the observed frequencies did not come from the population on which the Null Hypothesis is based."[7] If such is the case, the variance seen will likely be due to factors other than chance alone. For purposes of the study, the .05 level was accepted as significant.

Chapter IV also presents a number of additional factors suggested by respondents which they felt deserved consideration and which were not already included in the questionnaire.

Summary

The method of investigation used in the study required the following procedural steps:

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[6] Sidney Siegel, Non-Parametric Statistics for the Behavioral Sciences (New York: McGraw-Hill Book Company, Inc., 1956), p. 43.

[7] Ibid.

1. Information about the forms and materials used and the procedures followed by state selection committees were obtained from the national director of the 1970 OBTA program.
2. Using these materials, a preliminary questionnaire listing possible evaluative criteria was developed.
   a. A review of the literature to establish the basic concerns of the profession about criteria suitable to be used in a program of biology teacher evaluation was made.
3. The preliminary questionnaire was sent to a review panel consisting of persons involved in biology education and knowledgeable about the OBTA program for evaluation and revision.
4. Responses received from the review panel were analyzed and a revised form of the questionnaire containing their specific suggestions was developed.
5. Names and addresses of individual members of the 1970 Outstanding Biology Teacher Award program selection committees were obtained from the headquarters office of the National Association of Biology Teachers.
6. The revised questionnaire was sent to individual state selection committee members of the OBTA program following completion of their respective

selection processes for their rating of individual items of criteria.

7. Responses of returned questionnaires were analyzed to determine:
   a. The frequency and significance of the responses derived for each rating level for each item, within each of the separate judge-groups.
   b. The frequency and significance of differences noted between the responses derived for each rating level, for each item, between each separate judge-group.
   c. The significance of differences seen between responses for each item when rated both for the pre-screening and final phases of the evaluation process.

CHAPTER IV

ANALYSIS OF DATA

What inferences may be made from data developed in this study of evaluation of biology teachers? Specifically, who were the persons who served on the 1970 state selection committees of the Outstanding Biology Teacher Award program? What criteria appeared significant to them? Did members of different judge-groups value specific criteria differently? Was there a hierarchy of significant evaluative criteria?

This chapter has been organized to provide a description of data generated by the study and to make possible a logical interpretation of the several variable relationships developed.

Judge-Groups and Responses to the Questionnaire

Analysis of materials made available by the National Association of Biology Teachers and from returned questionnaires revealed that the two hundred twenty members of the 1970 state selection committees for the Outstanding Biology Teacher Award program could be categorized into eight separate judge-groups as follows:

1.	Secondary school teachers	58
2.	College biologists	56
3.	College professors of science education	28
4.	Industrial biologists	21
5.	State science supervisors	21
6.	Secondary school administrators	17
7.	Local school science supervisors	15
8.	Other: Dentists	2
	Director, outdoor education . .	1
	Graduate student, educator . . .	1
		220

Each of these persons was sent a copy of the questionnaire found in Appendix D and in addition to rating specific items, each was asked to indicate the number of years they had served as members of the Outstanding Biology Teacher Award program state selection committees. Results and percent response to this request are found in Table I.

Analysis of Table I reveals that one hundred seventy-nine completed questionnaires were returned out of a possible total of two hundred twenty, for an overall return of 81.36 percent. Returns from specific judge-groups ranged from 61.9 percent for the industrial biologist group to 94.11 percent for the judge-group category listed as public school administrators. The category entitled "Other" can be excluded because it did not comprise a homogeneous occupational group.

Generally, it would appear that members of the various judge-groups were relatively experienced in evaluating teachers for the Outstanding Biology Teacher Award, as they averaged 2.68 years as members of selection committees. The

TABLE I

NUMBER AND PERCENT OF RESPONSES TO THE QUESTIONNAIRE AND THE AVERAGE NUMBER OF YEARS SERVED AS MEMBERS OF OUTSTANDING BIOLOGY TEACHER AWARD PROGRAM SELECTION COMMITTEES, LISTED BY JUDGE-GROUP CATEGORIES,

Judge-Group	Total number in group	Number of replies	Percent of responses	Average number of years on committee
Secondary school biology teachers	58	41	70.69	1.83
College biologists	56	50	89.28	3.16
Professors of science education	28	25	89.28	3.20
State science supervisors	21	18	85.71	3.66
Industrial biologists . .	21	13	61.90	2.92
Public school administrators	17	16	94.11	2.12
Public school science supervisors	15	12	80.00	2.41
Other	4	4	100.00	2.75
Total	220	179	81.36	2.68

judge-group evidencing the most number of years experience was the State Science Supervisor group with 3.66 years, while those having the least experience was the group of secondary school biology teachers with an average of 1.83 years.

Visits to Classrooms of Candidates by Judges

In an effort to gain some insights into procedural arrangements and about how information about candidates was obtained, Section VII of the questionnaire asked the following questions of judge-group members:

1. Did you personally visit nominees or finalists in their classrooms?
2. If you did not visit nominees or finalists in their classrooms, was information related to their competencies with subject, student relationships, and classroom organization available from other sources?
3. If you did not visit as part of the selection process, were you acquainted personally with some of these aspects because of prior associations with some nominees?
4. If you answered yes to 3 above, explain.

Responses revealed that slightly over half (51.4 percent) of the selection committee members visited the classrooms of candidates for the purpose of on-site evaluations of related factors. Of those who did not visit (eighty-seven out of one hundred seventy-nine), almost all (eighty-four out of eighty-seven) said that they had knowledge about the candidates from personal experience or other sources. Included as other sources of such information were:

1. Association through professional meetings;
2. Work with candidates on professional committees, writing teams and science fairs;
3. Participation in classes of colleague or college professors;
4. Prior visits by science supervisors or supervisors of student teachers;
5. Acquaintance with publications made by the candidate; and
6. Knowledge of work done by students of the candidate.

Analysis of Data Related to Null Hypothesis Ho 1

To determine whether specific criteria might vary in worth during different phases of the evaluation process, judges were asked to rate each item twice, once for its value in the pre-screening process of evaluation, and once for its value to them during the final phases of selection. In this way, it was hoped to learn if some criteria might be of more value at times than others in making decisions about teacher worth.

Null Hypothesis Ho 1 related to this concern and was stated as follows:

> Ho 1: There is no significant difference in the ways that judges rate individual criteria which are used for both the pre-selection and final evaluation phases of biology teacher evaluation.

Analysis of data revealed that except for criteria

which were not suitable for application to both phases of the selection process, there was no significant difference in the ratings given to specific criteria when rated for both the pre-screening and final evaluation phases. Thus, Null Hypothesis Ho 1 was accepted.

Analysis of Data Related to Null Hypothesis Ho 2

Theorizing that the choice of one specific rating out of the five possible rating choices for a specific criterion might have occurred by chance, Null Hypothesis Ho 2 stated:

> Ho 2: There is no significant difference between the rating levels assigned by judges to the criteria used in the evaluation of biology teachers.

The data revealed that out of one hundred eleven items, twenty-three possessed rating levels which differed significantly from what would be expected by chance alone. (See Table II, Appendix F.) However, responses from the combined group of judges showed that not all categories of criteria were of similar importance to them when evaluating biology teachers. For example, none of the items found in Category A which contained items derived from the comments made about candidates by those who nominate or recommend, or in Category E which contained items related to the candidate's relationships to his school and community, were rated significantly by judges. Further, only one item each was found in Category B (academic background), Category C (teaching and other experiences), Category D (professional activities and accomplishments).

The category having the majority of significant items was "F," which consisted of items related to teacher, subject, student, and classroom relationships. Twenty-one out of the thirty-five items listed in Category F were significant at the .05 level or greater. Of these, all but two of the twenty-one were ranked high as "usually" or "always important." The two not ranked high were ranked in the middle as "sometimes important."

The list (page 82) summarizes the twenty-three items found to be significant as indicated in Table II.

Generally, the twenty-one items found to be rated significantly high in the list (page 82) can be classified into three major areas of concern:

1. Items related to the teachers' intrinsic personal traits:

   Interest and enthusiasm for biology (.001)

   Evidences of resourcefulness (.01)

   Adequacy of self-concept (.01)

   Evidences of ingenuity (.01)

   Emotional poise and self-confidence (.05)

   Evidences of creativity (.05)

   Apparent interest in self-improvement (.05)

2. Items related to teacher-student interrelationships:

   Ability to encourage self-motivation in students (.001)

   Ability to inspire self-confidence in students (.01)

Item	Chi square	Significance
Interest and enthusiasm for biology	20.7203	.001
Ability to encourage self-motivation in students	18.5379	.001
Concerns for student understandings of essential concepts	17.7566	.01
Ability to inspire self-confidence in students	14.7575	.01
Concerns for student understandings of essential science processes	14.7142	.01
Evidences of resourcefulness	14.6794	.01
Adequacy of self-concept	14.3892	.01
Concerns for personal involvement of students in learning activities	14.3568	.01
Evidences of ingenuity	13.6206	.01
Emotional poise and self-confidence	12.7789	.05
Evidences of creativity	12.3556	.05
Apparent interest of self-improvement	11.9054	.05
Skill in use of a variety of materials and methods	11.7590	.05*
Habits of dress, voice, mannerisms, speech	11.6778	.05
Activities and accomplishments of students	11.4719	.05
Involvement in personal scientific research	11.3441	.05*
Provisions for differing student interests and abilities	11.0983	.05
Laboratory experience characterized by thought-provoking problems	11.0433	.05
Efforts to encourage student development of hypotheses and theories	10.8200	.05
Favorable perceptions by students and parents	10.7748	.05
Facilitates worthwhile student interaction	10.3870	.05
Ability to develop a classroom climate conducive to learning	9.7873	.05
Perceptions of individual student needs	9.4948	.05

*Items were ranked only as "sometimes important."

Concerns for personal involvement of students in learning activities (.01)

Favorable perceptions by students and parents (.05)

Facilitates worthwhile student interaction (.05)

Perceptions of individual student needs (.05)

Provisions for differing student interests and needs (.05)

Efforts to encourage student development of hypotheses and theories (.05)

3. Items related to concerns for skills and proficiencies as a science teacher:

Concerns for student understandings of essential concepts (.01)

Concerns for student understandings of essential science processes (.01)

Skill in use of a variety of materials and methods (.05)

Activities and accomplishments of students (.05)

Laboratory experiences characterized by thought provoking problems (.05)

Ability to develop a classroom climate conducive to learning (.05)

Factors found to be not significant included those related to the number and kinds of academic course experiences or degrees, grades received, location or size of school, years of teaching experience, teaching or managerial efficiency, participation in school, community or professional organizations, publications made, honors or awards received, and the appearance of classroom and laboratory.

However, because twenty-three items were found for which rating levels differed significantly, Null Hypothesis Ho 2 was rejected.

Analysis of Data Related to Null Hypothesis Ho 3

Null Hypothesis Ho 3 stated that:

Ho 3: There is no significant difference in the ways that criteria used in the evaluation of biology teachers are rated between members of different judge-groups.

Table III, also in Appendix F, presents data from each of the seven judge-groups and indicates the number and percent of responses for each of the five possible rating levels of items found to be rated significantly different by the combined group of judges. The statistics reported indicate the number and percent of each judge-group responding for each rating-level option. For purposes of analysis and discussion, percents are often combined to indicate the highest and lowest rating relationships.

As indicated, Null Hypothesis Ho 3 reflected concern for evidences of bias on the part of judges who belonged to different occupational groups. Analysis of the data in Table III revealed that of the twenty-three items found to have significant rating-levels, eight were found to have been rated significantly different when used in the pre-screening process by different judge-groups. Thus, Null Hypothesis Ho 3 was rejected.

An analysis of each of the eight items found to have been rated significantly follows:

1. Apparent Interest in Self-Improvement (.01). Although the majority of each of the seven judge-groups rated this item high as usually or always important, only three fourths of the Public School Science Supervisors' groups considered it so. This contrasted with over 97 percent of the Secondary School Teacher group and all of the Industrial Biologists. Over 16 percent of the Public School Science Supervisors group responding to this item and over 6 percent of the College Biologist group considered it rarely important. Seventeen out of fifty-eight Secondary School Teachers thought the item to be not applicable.

2. Interest and Enthusiasm for Biology (.05). Over 8 percent of the Public School Science Supervisors responding felt this item to be rarely important and 6 percent of the College Biologists rated it rarely or not important. Although more than half of all groups rated it as either usually or always important, all of the Public School Administrators, all of the Industrial Biologists, and all of the Professors of Science Education responding considered it usually or always important to them. Nine out of twenty-one Industrial Biologists felt that it did not apply.

3. Concerns for Student Understandings of Essential Concepts (.05). Although all the Public School Administrators and over 95 percent of the Professors of Science Education responding to this item rated it usually or always

important, only about 72 percent of the State Science Supervisors and 58 percent of the Public School Science Supervisors rated it high. In fact, over 16 percent of the Public School Science Supervisors and approximately 8 percent of the College Biologists responding to this item considered it rarely important. Seventeen out of fifty-eight Secondary School Teachers and eight out of twenty-one Industrial Biologists considered it not applicable.

4. Concerns for Student Understandings of Essential Science Processes (.05). Although the majority of all groups considered this item to be usually or always important, differences existed between some groups. In this instance, all of the Professors of Science Education rated it high, while only 58.4 percent of the Public School Science Supervisors rated it thus. Almost 17 percent of the latter group considered this item to be rarely important. Seventeen out of fifty-eight Secondary School Teachers and eight out of twenty-one Industrial Biologists indicated the item did not apply.

5. Ability to Inspi Self-Confidence in Students (.05). Responses to this item were fairly diverse and ranged from 100 percent of responses either usually-to-always important for the State Science Supervisor group, to only 50 percent of the Public School Administrators rating it high. Several respondents rated the item either rarely important or not important to them in the evaluation process. Nineteen out of fifty-eight Secondary School

Teachers and nine out of twenty-one Industrial Biologists considered it to be not applicable for them.

6. Activities and Accomplishments of Students (.05). Analysis of data for this item revealed that although all of the Public School Administrators and Industrial Biologists rated it either usually or always important, this feeling was not shared by several of the other groups. In fact, only about 47 percent of the Secondary School Teachers and a little less than 60 percent of the Public School Science Supervisors and College Biologists rated it high.

Of significance were the responses which rated this item as rarely important or not important. These included Secondary School Teachers with 12.5 percent, Public School Science Supervisors with 16.7 percent, College Biologists with 10.7 percent, and Professors of Science Education with 8.3 percent.

7. Emotional Poise and Self-Confidence (.05). Analysis of the data for this group revealed that of those responding to the item as an item of importance to them, all judges in the Industrial Biologist group rated it either usually or always important. This contrasted with Public School Science Supervisors and State Science Supervisors whose responses in these categories amounted to about 65 percent each. Also, 17.7 percent of the Public School Science Supervisors and 10.9 percent of the College Biologists thought this trait to be rarely important to them.

Nine out of twenty-one Industrial Biologists and twenty-one out of fifty-eight Secondary School Teachers felt that the item did not apply.

8. Adequacy of Self-Concept (.05). Contrasts between the ratings assigned by various judge-groups were particularly noticeable for this item. Even though the majority of all groups rated this item high as usually or always important, 25 percent of the Public School Science Supervisors considered adequacy of the teachers' self concept to be rarely important, along with more than 12 percent of the Public School Administrators. Only approximately 50 percent of the College Biologists rated the item high, with only twenty-one out of fifty-six of their group considering the item applicable.

Table IV in Appendix F shows how individual judge-groups ranked each of the eight items from high to low.

Criteria Suggested by Respondents not Already Included in the Questionnaire

Although most respondents seemed satisfied with the nature and scope of items already included in the questionnaire, a few made use of the blank spaces provided and suggested several additional factors which were of importance to them. As these were quite varied and were stated in ways that made statistical analysis difficult, they are included here without reference to their significance.

In responding to Section II of the questionnaire, which contained factors derived from the nomination and recommendation forms of the Outstanding Biology Teacher Award program, several persons felt it would help to have some additional information about the following aspects of the candidate:

1. Dedication to teaching
2. Dedication to meeting individual student needs
3. Imagination and ability to innovate
4. General personality and energy
5. Ability to inspire students toward further education
6. Ability to study and try new directions
7. Use of holidays and vacation time.

Also, because it is often the principal or other school administrator who usually is asked to nominate or recommend candidates, one judge felt the need to state that "in many cases where recommendations are made by school administrators, I find upon investigation that the administrator has a rather poor concept of the teacher's ability."

In regard to Section III of the questionnaire, which contained factors related to the academic background and preparation of candidates, it was suggested by several judges that the following also be considered when evaluating teachers for the award:

1. Grades in student teaching
2. Types of science methods courses

3. The balance between science and non-science courses
4. Total grade point average for college work
5. Evidences of work of an investigative research nature
6. Evidences of work with living organisms

Because this category also included a number of items about the grades received in various college courses, several judges stated that they felt these should be excluded for consideration. One judge stated that "the taking of many courses is laudable and good but [he felt that] the ability to use the knowledge to present it to the students, and to bring out their cooperation and enthusiasm is better."

Comments regarding Section IV, which contained factors related to teaching and other experiences of the candidates, included the suggestion that some consideration be given to the amount of work experience in biology-related fields and to the amount of actual field work experience.

In Section V, which contained factors related to the professional activities and accomplishments, it was suggested that consideration be given to how well the teacher can motivate and stimulate student interest in biology, to evidences of success of former students in science following graduation from high school, and the types of summer school teaching experiences of the candidate.

Under Section VI, which contained factors related to school and community relations, several who responded

suggested that concern be given to the teacher's self concept as an educator, rather than just as a person, and one expressed this by saying that teachers should not evidence any "hang-ups about his identify as a teacher."

Section VII considered factors related to teacher-subject-student and classroom relationships, and several judges suggested the following additional factors be included:

1. Knowledge of the day's activities (when being visited)
2. Employment of innovative approaches
3. Efforts to improve student self concept
4. Efforts to teach scientific objectivity and honesty
5. Efforts to teach methodology of experimental design
6. Enthusiasm exhibited toward biology, students, and the school
7. Evidences of generosity and willingness to serve.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

As one of the most intensively researched areas in the field of education, the search for finding suitable methods and criteria for evaluating teacher competence and teacher effectiveness has resulted in a large number of recent studies.

Although a variety of approaches to study the topic have been devised, it is generally found that results of such studies are disappointing and that little agreement seems to exist between investigators over specifics such as the criteria which might be used, about who should do the evaluating, and about the subjective effects introduced into the process due to the personal biases of the judges involved.

That teachers are evaluated, and this quite often, is an undisputed fact, and many studies, reports, and materials have been prepared by both local and national agencies. However, most of these relate to the evaluation of teachers generally and a representative review of the literature revealed that apparently no comprehensive studies have been conducted on how a teacher might be evaluated as a biology teacher.

Even though no comprehensive studies were found, a national professional organization, the National Association of Biology Teachers, for about a decade has been engaged in a well organized and formal program of biology teacher evaluation. In this program, a teacher from each state, including Puerto Rico and the District of Columbia, is selected as an Outstanding Biology Teacher each year. Selection procedures require that a state selection committee be formed to evaluate individual candidates for the award. The composition of each state selection committee is varied, but usually consists of persons representing secondary school teachers, administrators, science supervisors, college and industrial biologists, and professors of science education.

In an effort to gain some understandings of how biology teachers are evaluated, this study asked that each of the two hundred twenty judges of the 1970 Outstanding Biology Teacher Award program rate the various criteria they utilized when evaluating candidates for the award. Ratings were analyzed to determine significance, and the study attempted to find answers to the following questions:

1. Who are these judges of biology teachers: What variety of occupational and/or educational positions do they represent.
2. What criteria do they employ in the evaluation process? Are some criteria of more value to some judges than others?

3. Does the occupational status of a judge relate to the way he evaluates a biology teacher? If so, in what ways?

This study of the evaluation of biology teachers was directed toward finding answers to the above questions and was limited to data resulting from the 1970 Outstanding Biology Teacher Award program of the National Association of Biology Teachers. The following steps were followed in the investigation:

1. Review of the literature to establish the needs of the profession for teacher evaluation, to isolate the problems inherent in a program of teacher evaluation; to determine the various criteria which might be applied, to gain some ideas about who might be appropriate judges of biology teachers, and to discover if the occupational status of various judges influences their evaluations of biology teachers.
2. Review of the materials, forms, and procedures utilized by the National Association of Biology Teachers and other groups to identify and develop a list of criteria which might be employed in the evaluation of a biology teacher.
3. Rating of these criteria by the various members of the 1970 Outstanding Biology Teacher Award program evaluation teams and subsequent analysis

to determine their significance and relative worth.

4. Making comparisons of the responses of judges belonging to differing occupational groups to establish if significant differences exist between the ratings assigned to specific criteria by members of different groups.

The significant findings of the study, together with appropriate recommendations are presented in this chapter.

Summary of Literature Review

A representative review of related literature indicated that the need for evaluation of teachers is an accepted aspect of the educational profession and that various individuals and groups claim the right to be involved in the evaluation process. Included are such persons as school administrators and supervisors, and groups such as the National Education Association, local and state teachers' associations, and professional teaching organizations such as the National Association of Biology Teachers.

Essential problems in the process of evaluation of teachers included concerns about: the lack of standards which are suitable for measurement; the difficulties of separating assessment of the teaching act from assessment of the teacher; the lack of agreement between observers about the terms used to describe competence or effectiveness; and

the apparent disagreement of researchers regarding the interpretation of findings.

One of the vital concerns of investigators of teacher competence related to the identification of suitable criteria which might be utilized in a teacher evaluation process. A number of studies have resulted in development of lists of such criteria and these generally can be placed into a number of distinct categories including: competency in subject matter; effectiveness in instructional approaches and techniques; personal activities leading to professional growth and development; and those criteria which are concerned with a teacher's intrinsic personal traits.

Although it is not unusual for a single supervisory or administrative person such as a principal or supervisor to be the person responsible for evaluating a teacher, the literature suggests that evaluation should be a cooperative effort and that teachers should have the opportunity to be evaluated by a team of persons who reflect a variety of special interests and value systems. In this way it is hoped that a broader base of competencies can be evaluated and that a more comprehensive evaluation will result.

The literature further suggested that because of the unique and personal biases which exist within each individual judge of teachers, it is not possible to be objective, impartial, or "fair" in any evaluation process. Because of this subjectivity, one should not assume a single set of

educational objectives but instead should expect as many different evaluation outcomes as there are different views represented.

Except for the materials and procedures of the National Association of Biology Teachers' Outstanding Biology Teacher Award program, it appeared that teachers of biology are evaluated much the same as teachers of any other subject. Regarding the Association program, it was found that the categories of criteria utilized were similar to those developed by other organizations and groups. However, the evaluation program of the National Association of Biology Teachers does involve persons having various occupational concerns, both within and outside the public school setting, and it does require that a diverse team of evaluators interact when making judgments of teacher worth.

Summary of the Study

Design

This study involved the two hundred twenty members of the forty-seven state selection committees active in the 1970 program of the Outstanding Biology Teacher Award program and the data provided by the one hundred seventy-nine who returned completed questionnaires.

From the related literature and materials provided by the Association, a questionnaire containing one hundred eleven items which might be used as criteria when evaluating biology teachers was developed and sent to committee members

to be rated according to their value to them when used in both the pre-screening and final phases of evaluation.

Summary of Data Analysis

From data derived from the one hundred seventy-nine completed questionnaires which were returned, appropriate occupational groups of judges were established.

Chi square analyses were computed to establish the significance of differences noted between the ratings given each item when it was rated for both the pre-screening and final phases of evaluation.

Chi square analyses were computed to establish the significance of differences seen between the responses for each rating-level for each item.

Chi square analyses were computed to establish the significance of the differences noted between the ratings assigned each item by different judge-groups.

Conclusions

Throughout the course of this investigation, the intent was to discover something about the evaluation of biology teachers and not to evaluate the various aspects of the Outstanding Biology Teacher Award program. As indicated in Chapter III, the program was used because it offered an excellent opportunity to collect data about biology teacher evaluation on an unusually comprehensive scale. Further it seemed to adequately provide for the concerns expressed

in the literature for variety in the points of view of judges and for deriving the criteria which they might employ when evaluating biology teachers. The investigator does not wish his conclusions to be interpreted as judgments of the program, although he is impressed with it as a model for teacher evaluation by a professional group.

The study attempted: (1) to establish the criteria that members of the Outstanding Biology Teacher Award program committees used when evaluating biology teachers; (2) to identify the various types of their occupations; (3) to establish whether or not specific criteria were valued significantly different between rating levels; and (4) to determine if occupational status of judges significantly related to the way they rated specific criteria.

To facilitate clarity, the conclusions of the study are organized under each of the three null hypotheses established for the study:

Null Hypothesis Ho 1:

> There is no significant difference in the ways that judges rate individual criteria which are used for both the pre-selection and final evaluation phases of biology teacher evaluation.

Analysis of the chi square levels derived for the combined ratings of all judges revealed that no significant differences existed between the ratings given to items when used for pre-selection and the ratings given to the same items when used for the final evaluation of candidates for the Outstanding Biology Teacher Award. Because the criteria

were not rated significantly different, it appeared that judges made no important distinction between criteria which they used to pre-screen candidates and those they used to eliminate finalists. Thus, Null Hypothesis Ho 1 was accepted.

Null Hypothesis Ho 2:

> There is no significant difference between rating levels assigned by judges to the criteria used in evaluation of biology teachers.

Analysis of the chi square levels derived for the ratings given to each of the one hundred eleven items revealed there were twenty-three items (Table III) which possessed rating levels that differed from what might have occurred by chance at the .05 level of significance or better. Of these, twenty-one were rated significantly high and two were ranked significantly in the middle range.

Of the twenty-one items which judges rated high, seven related to factors associated with the teachers' intrinsic personal characteristics, eight related to factors of teacher-student interaction, and six related to skills and proficiencies as a science teacher. Factors which were rated lowest related to the teacher's academic background and preparation, his teaching experiences and responsibilities, and to his professional activities and accomplishments. Apparently, these latter factors were not as important to these judges. Because some significant criteria were found, Null Hypothesis Ho 2 was rejected.

Null Hypothesis Ho 3:

> There is no significant difference in the ways that criteria used in the evaluation of biology teachers are rated between members of different judge-groups.

Analysis of chi square derivations for ratings given to each of the one hundred eleven items of the questionnaire revealed that eight items were rated significantly different by different judge-groups (Table IV). Thus, it was possible to say that the occupational status of a judge is reflected in the way he evaluates a biology teacher, and that the criteria he used were applied according to his expectations of the teacher's role. Therefore, Null Hypothesis Ho 3 could also be rejected.

Recommendations

The following recommendations are offered for consideration:

1. Because it was found in this study that the evaluation of biology teachers for the Outstanding Biology Teacher Award was subjective, and that various types of judges utilized some evaluative criteria differently according to differences in their occupational status, it is recommended that programs of teacher evaluation follow the Outstanding Biology Teacher Award program model and employ a team of evaluators which represents a variety of outlooks and job expectations.

2. The teacher of biology having concern for a satisfactory evaluation in his teaching situation should familiarize himself with those criteria likely held to be of value to those who evaluate him.
3. Because it was found that not all criteria utilized in this study were significant to the evaluation process, it is recommended that in the interest of efficiency, programs of evaluation of biology teachers de-emphasize criteria which relate to participation in school and community activities and affairs, the teacher's academic background, his teaching experiences and responsibilities, and his professional activities and accomplishments, and stress those which relate to teacher-subject-student relationships as listed in Table III.
4. Those responsible for pre-service and in-service programs of education for the teacher of biology should explore the possibility of including experiences which will encourage development of adequacy of teacher self-concept and resourcefulness, emotional poise and self-confidence, interest in personal and professional growth, abilities to encourage self-motivation and self-confidence in students, understandings of student needs, skill in use of a variety of methods and materials,

and abilities which will aid him in developing a classroom climate conducive to learning essential science concepts and processes.

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APPENDIXES

APPENDIX A

LIST OF OBTA SELECTION COMMITTEE MEMBERS

Selection Committee Members

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Waterville, Maine

Dr. Paul Ackerson
University of Nebraska
Omaha, Nebraska

Mr. Roy Alexander
Waterford Public Schools
Waterford, Michigan

Verl P. Allman
Brigham Young University
Provo, Utah

R. Lamar Allred
Utah State Dept. of Public Instruction
Salt Lake City, Utah

Dr. Ray Allred
Continental Oil Company
Ponca City, Oklahoma

Mrs. Gail Alwin
Bladensburg Senior High School
Bladensburg, Maryland

Dr. George Anastos
University of Maryland
College Park, Maryland

Dr. Doyle Anderegg
University of Idaho
Moscow, Idaho

Roger Andersen, D.D.S.
Lead, South Dakota

Mrs. Jess Anthony
Memorial Senior High School
Houston, Texas

Mr. Donald Arkell
Clark County Health Department
Las Vegas, Nevada

Dr. Terry Armstrong
University of Idaho
Moscow, Idaho

Harold Arndt
Vocal Line, Inc.
Woolwich, Maine

William Ausmann
Lead High School
Lead, South Dakota

Robert S. Bailey
Virginia Institute of Marine Science
Gloucester Point, Virginia

Dr. Robert H. Barker
Eastern Kentucky University
Richmond, Kentucky

Mr. Robert E. Bartnett
Harris County Mosquito Control
Houston, Texas

Mr. Richard Barton
Alameda High School
Denver, Colorado

Robert Battle
Ankeny High School
Ankeny, Iowa

Ruel Becker
Trexler Senior High School
Allentown, Pennsylvania

Reverend H. V. Beechem
Schulte High School
Terre Haute, Indiana

Dr. Marjorie Behringer
University of North Dakota
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Dr. Harry Bennett
Louisiana State University
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Mr. W. H. Berryman
Palm Beach County Schools
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Mr. Charles E. Biggs, Jr.
Sidwell Friends School
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Mr. Dale Billman
Charles Pfizer and Company
Terre Haute, Indiana

Richard Biros
Hackensack High School
Hackensack, New Jersey

Dr. Harald N. Bliss
Mayville State College
Mayville, North Dakota

Mr. Rod W. Bolin
Wheatridge High School
Wheatridge, Colorado

Dr. John Boole
Georgia Southern College
Collegeboro, Georgia

Dr. Dale Bray
University of Delaware
Newark, Delaware

Sister Mary Breta
McCauley High School
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Fitchburg High School
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Hannah R. Burke
Ryan Junior High School
Fairbanks, Alaska

Vance Calder
Orem High School
Orem, Utah

Sister Catherine
Mater Cleri Seminary
Colbert, Washington

Sister Cecilia
Mundelein College
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Lead, South Dakota

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Dr. Kenneth Landers
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University of Missouri
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Sunnyslope High School
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Reinwald Liechty
Brigham Young University
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Dr. Lorenzo Lisonbee
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Thomas Lowery
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North Dakota State University
Fargo, North Dakota

Charles E. Seaman
Madison High School
Madison, New Jersey

Mr. Vincent G. Sindt
Wyoming State Department of Education
Cheyenne, Wyoming

David T. Smith
Tucson Public Schools
Tucson, Arizona

David R. Snow
Concord High School
Wilmington, Delaware

C. Richard Snyder
Community College of Philadelphia
Philadelphia, Pennsylvania

Dr. Herbert E. Speece
North Carolina State University
Raleigh, North Carolina

Dr. Dwight Spencer
Kansas State Teachers College
Emporia, Kansas

Douglas Stafford
Maine Department of Education
Augusta, Maine

Mr. Robert Starr
University of Missouri
Columbia, Missouri

Dr. Robert W. Stegner
University of Delaware
Newark, Delaware

Dr. Herbert H. Stewart
Florida Atlantic University
Boca Raton, Florida

Mr. Paul Stockwell
Lyndon State College
Lyndon Center, Vermont

Sister Rita Blanche St. Pierre
Rice Memorial High School
South Burlington, Vermont

Miss Ruth C. Strosnider
Woodrow Wilson High School
Washington, D. C.

Rosemary Strother
Clarke Junior High School
Athens, Georgia

Dr. Travis E. Stubblefield
M. D. Anderson Hospital
Houston, Texas

Gerald Tague
Wichita High School East
Wichita, Kansas

Dr. Paul Taylor
Wisconsin State University
Oshkosh, Wisconsin

Mr. Ray Thiess
Marshfield High School
Coos Bay, Oregon

Frank K. Thomson
Bladenburg Senior High School
Bladenburg, Maryland

Miss Leona Todd
Oregon College of Education
Monmouth, Oregon

Mrs. Brenda Townes
Model High School
Richmond, Kentucky

Mr. Lane Trantham
Darlington Schools
Darlington, South Carolina

Gerald L. Trout
University of New Mexico
Albuquerque, New Mexico

Dr. George C. Turner
California State College
Fullerton, California

Douglas Volmer
Westbrook Junior College
Portland, Maine

Mr. J. C. Ward
Tennessee Regional Director of Instruction
Sparta, Tennessee

Robert B. Weeden
Grenac Road
Fairbanks, Alaska

Mr. William G. Wert
Indiana State University
Terre Haute, Indiana

Jonathon J. Westfall
University of Georgia
Athens, Georgia

Dr. Wesley Wiles
University of Nevada
Las Vegas, Nevada

Ray W. Wilke
Basic High School
Henderson, Nevada

Mr. Earl Williams
Canyon School District #139
Caldwell, Idaho

Jane Williams
Lathrop High School
Fairbanks, Alaska

Mrs. Vernon Wills
Hazen High School
Hazen, Arkansas

Dr. Joseph Wise
Eastern Kentucky University
Richmond, Kentucky

Dr. Weldon Witters
Ohio University
Athens, Ohio

Mr. Mark Wolf
Dow Chemical Company
Midland, Michigan

Dr. Robert A. Zottoli
Fitchburg State College
Fitchburg, Massachusetts

APPENDIX B

LIST OF PANEL MEMBERS

Review Panel

Leonard C. Blessing
Science Department
Millburn Senior High School
Millburn, New Jersey

William L. Brisby
Biology Department
Moorpark College
Moorpark, California

Dr. Paul B. Hounshell
School of Education
University of North Carolina
Chapel Hill, North Carolina

Leon E. Jordan
Department of Biology
Camelback High School
Phoenix, Arizona

Dr. Jerry P. Lightner
Executive Secretary
NATL Association of
Biology Teachers
Washington, D. C.

Dr. Ivo E. Lindauer
Department of Biology
University of Northern
Colorado
Greeley, Colorado

Dr. William V. Mayer,
Director
Biological Science Curriculum Study (BSCS)
University of Colorado
Boulder, Colorado

Dr. Wendell F. McBurney
Indiana University
Bloomington, Indiana

Dr. George C. Turner
Department of Science and
Math Education
California State College
Fullerton, California

Dr. Burton E. Voss
School of Education
University of Michigan
Ann Arbor, Michigan

Dr. Stanley E. Williamson
Oregon State University
Corvallis, Oregon

Dr. Robert E. Yager
Science Education Center
University of Iowa
Iowa City, Iowa

APPENDIX C

LETTERS

Letter to Review Panel

Dear

As you perhaps know, I am in the process of finishing a program of studies at the University of North Carolina and am planning to study some of the aspects of the OBTA program for the dissertation. I have enclosed copies of the proposal summary and the two questionnaires that will be used.

As you read the summary, you will see that the study involves basically: identification of the criteria used in the selection process; an attempt to determine their relative importance; development of a "profile" of teachers selected as outstanding; and identification of factors which might be common in the schools and communities of teachers selected. It has been accepted by my committee and it was briefly discussed at the Board of Directors meeting last July. I am asking a number of them for help.

I would very much appreciate your taking time out of an already busy schedule to look over the questionnaires and to suggest some ways they might be improved. I would particularly welcome your comments about the phrasing of specific items and questions and your suggestions about what might be asked.

As I plan to send the questionnaires to recipients of the award and to members of selection committees soon after the program is completed in each state, I would appreciate return of the materials with your suggestions as soon as possible. An addressed and stamped envelope is enclosed.

If there is more you would like to know about the study, please write and I will be glad to oblige. I sincerely appreciate your interest and help. Perhaps I can finish the study this summer.

Sincerely,

Donn L. Dieter
Assistant Executive Secretary
[The National Association of
Biology Teachers, Inc.]

DLD:dd

Encl.

Letter to Selection Committee Members

Dear

As a member of a 1970 state selection committee, you are perhaps aware that this is the ninth year NABT has sponsored the Outstanding Biology Teacher Award Program. The Association is pleased with the selections made each year and it feels that much of this is due to the patient and thoughtful consideration of candidates by committee members. It is in regard to your work on this committee that I am writing to you.

Although it is felt that each state recipient of the award has consistently represented the very best of the biology teaching community, not much seems to be known about the things that committee members considered important in evaluating nominees. In other words, even though these are very good teachers, many of the important criteria operating in the selection process are unknown.

In an effort to learn more about this aspect of teacher evaluation, I am currently conducting a dissertational study at the University of North Carolina, and am asking you to respond to the items contained in the enclosed questionnaire. I know that this will likely be an added burden to an already busy schedule, but feel that in order to make an adequate study, your views need to be represented.

I sincerely appreciate your work on the committee this year and want to thank you in advance for completing the questionnaire. You are not being asked to give your name and individual responses will be held confidential. No comparisons will be made that will reflect unfavorably on any aspect of the OBTA program.

An addressed and stamped envelope is enclosed for your use in returning the questionnaire. So that I can complete the study during the summer, I would appreciate a prompt reply.

Sincerely,

Donn L. Dieter
Assistant Executive Secretary
[The National Association of
Biology Teachers, Inc.]

DLD:ss
Encl.

Follow-Up Letter to Selection Committee Members

NOTE:

This second letter and questionnaire is being sent in the event that you did not receive the initial set sent earlier in the summer. If the first was received, please disregard this letter and return the original completed questionnaire as soon as possible.

APPENDIX D

QUESTIONNAIRE

QUESTIONNAIRE

2

TO: MEMBERS OF THE 1969-70 STATE SELECTION COMMITTEES FOR THE NABT OUTSTANDING BIOLOGY TEACHER AWARD

The categories and items listed in this questionnaire represent various kinds of competencies, experiences, traits and behaviors that members of state selection committees might have considered important in evaluating nominees for the Outstanding Biology Teacher Award.

As some of these items were perhaps more useful or important than others in helping to make decisions about nominees, you are asked to rate each item according to your perception of its worth. And as some items might have been of more value during one phase of the process than another, you are asked to rate each according to its importance or usefulness for both the pre-screening and the final evaluation phases of selection. Space is provided for inclusion and rating of items not listed which you feel contributedto your decisions.

In rating, use the following scale:

1 Not important	4 Usually important
2 Rarely important	5 Always important
3 Sometimes important	N Not applicable

Directions:

Indicate by circling one of the six choices, the degree to which you feel an item was important in helping you to select a teacher to receive the Outstanding Biology Teacher Award. Please note that you are asked to rate each item twice; first, for its value in the pre-screening process, and second, for its value in evaluating finalists for the award. If an item did not apply for a particular phase of the selection process, circle N.

Your reply will be kept confidential and no comparisons will be made of the responses between individual states. You are not asked to sign the questionnaire. Please return as soon as completed in the enclosed stamped and addressed envelope to:

Donn L. Dieter
NABT National Office
Washington, D. C. 20005

Your cooperation is sincerely appreciated.

I. Committee Member Information:

1. Counting this year, how many years have you served as a member of an OBTA State Selection Committee? ____Years.

2. If you were Director of the program in your state this year check here ____.

3. Please check the category which best describes your current position:

____ Secondary School Teacher
____ Public School Administrator
____ Public School Science Supervisor
____ State Science Supervisor
____ Industrial Biologist
____ College Biologist
____ Professor of Science Education
____ Other (Specify): _____

II. FACTORS DERIVED FROM NOMINATION AND RECOMMENDATION FORMS:

	Importance in: Pre Screening	Evaluating finalists
1. Status or position of person making nomination or recommendation comments.	1 2 3 4 5 N	1 2 3 4 5 N
2. Comments about teaching ability.	1 2 3 4 5 N	1 2 3 4 5 N
3. Comments about teaching techniques.	1 2 3 4 5 N	1 2 3 4 5 N
4. Comments about comprehensiveness of course.	1 2 3 4 5 N	1 2 3 4 5 N
5. Comments about interest in teaching.	1 2 3 4 5 N	1 2 3 4 5 N
6. Comments about interest of students in classes.	1 2 3 4 5 N	1 2 3 4 5 N
7. Comments about the teacher's cooperativeness in the total school program.	1 2 3 4 5 N	1 2 3 4 5 N
8. Comments about the teacher's cooperativeness in community affairs.	1 2 3 4 5 N	1 2 3 4 5 N

II. (Continued):	Importance in: Pre Screening	Evaluating finalists
9. Comments about initiative.	1 2 3 4 5 N	1 2 3 4 5 N
10. Comments about inventiveness.	1 2 3 4 5 N	1 2 3 4 5 N
11. Comments about adaptability.	1 2 3 4 5 N	1 2 3 4 5 N
12. Comments about principal strengths.	1 2 3 4 5 N	1 2 3 4 5 N
13. Comments about principal weaknesses.	1 2 3 4 5 N	1 2 3 4 5 N
Other: (Specify)		
14.	1 2 3 4 5 N	1 2 3 4 5 N
15.	1 2 3 4 5 N	1 2 3 4 5 N
III. FACTORS RELATED TO ACADEMIC BACKGROUND:		
1. Reputation of schools, colleges or universities attended.	1 2 3 4 5 N	1 2 3 4 5 N
2. Recency of academic experiences.	1 2 3 4 5 N	1 2 3 4 5 N
3. Evidences of continuing education.	1 2 3 4 5 N	1 2 3 4 5 N
4. Participation in institutes, seminars, special programs.	1 2 3 4 5 N	1 2 3 4 5 N
5. Undergraduate degree in biological sciences.	1 2 3 4 5 N	1 2 3 4 5 N
6. Undergraduate degree in education.	1 2 3 4 5 N	1 2 3 4 5 N
7. Undergraduate degree in liberal arts.	1 2 3 4 5 N	1 2 3 4 5 N
8. Graduate degree in biological sciences.	1 2 3 4 5 N	1 2 3 4 5 N
9. Graduate degree in education.	1 2 3 4 5 N	1 2 3 4 5 N

III. (Continued):

		Importance in: Pre Screening						Evaluating finalists					
10.	Type of teaching certificate.	1	2	3	4	5	N	1	2	3	4	5	N
11.	Number of hours for courses in biological sciences.	1	2	3	4	5	N	1	2	3	4	5	N
12.	Variety of courses in biological sciences.	1	2	3	4	5	N	1	2	3	4	5	N
13.	Grade point average in biological sciences.	1	2	3	4	5	N	1	2	3	4	5	N
14.	Number of hours for courses in Chemistry.	1	2	3	4	5	N	1	2	3	4	5	N
15.	Variety of chemistry courses.	1	2	3	4	5	N	1	2	3	4	5	N
16.	Grade point average in chemistry courses.	1	2	3	4	5	N	1	2	3	4	5	N
17.	Number of hours for courses in Physics.	1	2	3	4	5	N	1	2	3	4	5	N
18.	Variety of physics courses.	1	2	3	4	5	N	1	2	3	4	5	N
19.	Grade point average in physics courses.	1	2	3	4	5	N	1	2	3	4	5	N
20.	Number of hours for courses in Mathematics.	1	2	3	4	5	N	1	2	3	4	5	N
21.	Variety of mathematics courses.	1	2	3	4	5	N	1	2	3	4	5	N
22.	Grade point average in mathematics courses.	1	2	3	4	5	N	1	2	3	4	5	N
23.	Number of hours for courses in earth sciences.	1	2	3	4	5	N	1	2	3	4	5	N
24.	Variety of earth science courses.	1	2	3	4	5	N	1	2	3	4	5	N
25.	Grade point average in earth science courses.	1	2	3	4	5	N	1	2	3	4	5	N
26.	Number of hours for courses in Education.	1	2	3	4	5	N	1	2	3	4	5	N

III. (Continued):

		Importance in: Pre Screening	Evaluating finalists
27.	Variety of professional education courses.	1 2 3 4 5 N	1 2 3 4 5 N
28.	Grade point average in professional education courses.	1 2 3 4 5 N	1 2 3 4 5 N
29.	Apparent interest in self-improvement.	1 2 3 4 5 N	1 2 3 4 5 N
Other: (Specify)			
30.		1 2 3 4 5 N	1 2 3 4 5 N
31.		1 2 3 4 5 N	1 2 3 4 5 N
32.		1 2 3 4 5 N	1 2 3 4 5 N
33.		1 2 3 4 5 N	1 2 3 4 5 N
34.		1 2 3 4 5 N	1 2 3 4 5 N
35.		1 2 3 4 5 N	1 2 3 4 5 N

IV. FACTORS RELATED TO TEACHING AND OTHER EXPERIENCES:

1.	Number of years teaching experience.	1 2 3 4 5 N	1 2 3 4 5 N
2.	Number of years teaching science.	1 2 3 4 5 N	1 2 3 4 5 N
3.	Number of years teaching biology.	1 2 3 4 5 N	1 2 3 4 5 N
4.	Types or levels of biology classes taught.	1 2 3 4 5 N	1 2 3 4 5 N
5.	Number of other science classes taught daily.	1 2 3 4 5 N	1 2 3 4 5 N
6.	Number of biology classes taught daily.	1 2 3 4 5 N	1 2 3 4 5 N
7.	Administrative or supervisory responsibilities.	1 2 3 4 5 N	1 2 3 4 5 N

IV. (Continued):

		Importance in: Pre Screening	Evaluating finalists
8.	Size of school where teaching.	1 2 3 4 5 N	1 2 3 4 5 N
9.	Location of school where teaching.	1 2 3 4 5 N	1 2 3 4 5 N
10.	Variety of schools where teacher has taught.	1 2 3 4 5 N	1 2 3 4 5 N
11.	Involvement in personal scientific research.	1 2 3 4 5 N	1 2 3 4 5 N
12.	Work experiences in science research.	1 2 3 4 5 N	1 2 3 4 5 N
13.	Work experiences in business or industry.	1 2 3 4 5 N	1 2 3 4 5 N
14.	Hobby or avocational interests.	1 2 3 4 5 N	1 2 3 4 5 N
15.	Contributory travel experiences.	1 2 3 4 5 N	1 2 3 4 5 N
Other: (Specify):			
16.		1 2 3 4 5 N	1 2 3 4 5 N
17.		1 2 3 4 5 N	1 2 3 4 5 N
18.		1 2 3 4 5 N	1 2 3 4 5 N
19.		1 2 3 4 5 N	1 2 3 4 5 N
20.		1 2 3 4 5 N	1 2 3 4 5 N

V. FACTORS RELATED TO PROFESSIONAL ACTIVITIES AND ACCOMPLISHMENTS:

1.	Number of memberships in professional organizations.	1 2 3 4 5 N	1 2 3 4 5 N
2.	Memberships in honorary professional science organizations.	1 2 3 4 5 N	1 2 3 4 5 N
3.	Memberships in honorary professional education organizations.	1 2 3 4 5 N	1 2 3 4 5 N
4.	Participation in professional organizations.	1 2 3 4 5 N	1 2 3 4 5 N

V. (Continued):

		Importance in: Pre Screening	Evaluating finalists
5.	Number and kinds of offices, duties and assignments held in professional organizations.	1 2 3 4 5 N	1 2 3 4 5 N
6.	Participation in other school, state, and community organizations.	1 2 3 4 5 N	1 2 3 4 5 N
7.	Types of professional journals read.	1 2 3 4 5 N	1 2 3 4 5 N
8.	Number of professional journals read.	1 2 3 4 5 N	1 2 3 4 5 N
9.	Publications made in professional and other journals.	1 2 3 4 5 N	1 2 3 4 5 N
10.	Number of scholarships, honors, grants, and awards received.	1 2 3 4 5 N	1 2 3 4 5 N
11.	Sponsorship or consultant to seminars, institutes, workshops for teachers.	1 2 3 4 5 N	1 2 3 4 5 N
12.	Participation in development of courses, curriculum materials, texts.	1 2 3 4 5 N	1 2 3 4 5 N
13.	Sponsorship of clubs, institutes, seminars, fairs, for students.	1 2 3 4 5 N	1 2 3 4 5 N
14.	Activities and accomplishments of students.	1 2 3 4 5 N	1 2 3 4 5 N
Other: (Specify):			
15.		1 2 3 4 5 N	1 2 3 4 5 N
16.		1 2 3 4 5 N	1 2 3 4 5 N
17.		1 2 3 4 5 N	1 2 3 4 5 N
18.		1 2 3 4 5 N	1 2 3 4 5 N
19.		1 2 3 4 5 N	1 2 3 4 5 N
20.		1 2 3 4 5 N	1 2 3 4 5 N

VI. FACTORS RELATED TO SCHOOL AND COMMUNITY RELATIONS:	Importance In: Pre Screening	Evaluating finalists
1 Cooperativeness with colleagues.	1 2 3 4 5 N	1 2 3 4 5 N
2. Participation in school activities.	1 2 3 4 5 N	1 2 3 4 5 N
3. Participation in civic affairs.	1 2 3 4 5 N	1 2 3 4 5 N
4. Participation in political affairs.	1 2 3 4 5 N	1 2 3 4 5 N
5. Participation in social affairs.	1 2 3 4 5 N	1 2 3 4 5 N
6. Participation in religious affairs.	1 2 3 4 5 N	1 2 3 4 5 N
7. Concerns for school-community relationships.	1 2 3 4 5 N	1 2 3 4 5 N
8. Initiative in assuming school responsibilities.	1 2 3 4 5 N	1 2 3 4 5 N
9. Efficiency in handling school records, reports and accounts.	1 2 3 4 5 N	1 2 3 4 5 N
Other: (Specify):		
10.	1 2 3 4 5 N	1 2 3 4 5 N
11.	1 2 3 4 5 N	1 2 3 4 5 N
12.	1 2 3 4 5 N	1 2 3 4 5 N
13.	1 2 3 4 5 N	1 2 3 4 5 N
14.	1 2 3 4 5 N	1 2 3 4 5 N

VII. FACTORS RELATED TO TEACHER, SUBJECT, STUDENT, CLASSROOM RELATIONSHIPS:

1. Did you personally visit nominees or finalists in their classrooms? ____ Yes ____ No

2. If you did not visit nominees or finalists in their classrooms, was information related to their competencies with subject, student relationships, and classroom organization available from other sources? ____ Yes ____ No

3. If you did not visit as part of the selection process, were you acquainted personally with some of these aspects because of prior associations with some nominees? ____ Yes ____ No

4. If you answered Yes to 3, above, explain: _____

_____

_____

_____

_____

		Importance in: Pre Screening	Evaluating finalists
5.	Interest and enthusiasm for biology.	1 2 3 4 5 N	1 2 3 4 5 N
6.	Concerns for student understandings of essential concepts.	1 2 3 4 5 N	1 2 3 4 5 N
7.	Concerns for student understandings of essential science processes.	1 2 3 4 5 N	1 2 3 4 5 N
8.	Concerns for student understandings of the structure of the science of biology.	1 2 3 4 5 N	1 2 3 4 5 N
9.	Efforts to encourage student development of hypotheses and theories.	1 2 3 4 5 N	1 2 3 4 5 N

VII. (Continued);

		Importance in: Pre Screening	Evaluating finalists
10.	Concerns for student understandings of human implications of modern biological developments.	1 2 3 4 5 N	1 2 3 4 5 N
11.	Concerns for personal involvement of students in learning activities.	1 2 3 4 5 N	1 2 3 4 5 N
12.	Understandings of the learning process.	1 2 3 4 5 N	1 2 3 4 5 N
13.	Confidence in knowledge of subject matter.	1 2 3 4 5 N	1 2 3 4 5 N
14.	Ability to organize and present materials.	1 2 3 4 5 N	1 2 3 4 5 N
15.	Ability to develop a classroom climate conducive to learning.	1 2 3 4 5 N	1 2 3 4 5 N
16.	Skill in use of a variety of materials and methods.	1 2 3 4 5 N	1 2 3 4 5 N
17.	Leadership in determining tone of classroom activities.	1 2 3 4 5 N	1 2 3 4 5 N
18.	Provisions for experience-centered learning.	1 2 3 4 5 N	1 2 3 4 5 N
19.	Laboratory experiences characterized by thought provoking problems.	1 2 3 4 5 N	1 2 3 4 5 N
20.	Appearance of classroom and laboratory.	1 2 3 4 5 N	1 2 3 4 5 N
21.	Evidences of creativity.	1 2 3 4 5 N	1 2 3 4 5 N
22.	Evidences of resourcefulness.	1 2 3 4 5 N	1 2 3 4 5 N
23.	Evidences of ingenuity.	1 2 3 4 5 N	1 2 3 4 5 N
24.	Perceptions of individual student needs.	1 2 3 4 5 N	1 2 3 4 5 N
25.	Provisions for differing student interests and abilities.	1 2 3 4 5 N	1 2 3 4 5 N

VII. (Continued):

		Importance in: Pre Screening	Evaluating finalists
26.	Ability to encourage self-motivation in students.	1 2 3 4 5 N	1 2 3 4 5 N
27.	Ability to inspire self-confidence in students.	1 2 3 4 5 N	1 2 3 4 5 N
28.	Facilitates worthwhile student interaction.	1 2 3 4 5 N	1 2 3 4 5 N
29.	Emotional poise and self-confidence.	1 2 3 4 5 N	1 2 3 4 5 N
30.	Habits of dress, voice, mannerisms, speech.	1 2 3 4 5 N	1 2 3 4 5 N
31.	Adequacy of self concept.	1 2 3 4 5 N	1 2 3 4 5 N
32.	Concerns for personal growth.	1 2 3 4 5 N	1 2 3 4 5 N
33.	Sense of humor.	1 2 3 4 5 N	1 2 3 4 5 N
34.	Tolerance for ambiguity.	1 2 3 4 5 N	1 2 3 4 5 N
35.	Favorable perceptions by students and parents.	1 2 3 4 5 N	1 2 3 4 5 N
Other: (Specify):			
36.		1 2 3 4 5 N	1 2 3 4 5 N
37.		1 2 3 4 5 N	1 2 3 4 5 N
38.		1 2 3 4 5 N	1 2 3 4 5 N
39.		1 2 3 4 5 N	1 2 3 4 5 N

APPENDIX E

OUTSTANDING BIOLOGY TEACHER AWARD PROGRAM FORMS

Date _____

National Association of Biology Teachers

OUTSTANDING HIGH SCHOOL BIOLOGY TEACHER AWARD

State Director:

National Chairman:
William L. Brisby
Moorpark College
Moorpark, California

NOMINATION - RECOMMENDATION FORM

This form should be completed only by a person in the education profession qualified to judge the teaching effectiveness of the candidate or, if not in the education profession, by a person uniquely qualified to know of the teaching effectiveness of the candidate. Two such recommendations must be mailed to the State Director by JANUARY 1

Statements by the recommending person must be specific. Give specific examples to support general statements like, "has good work habits," or "is an excellent teacher," etc. Unless you give specific examples, you penalize the candidate.

Name of candidate _____

School in which candidate teaches _____

Address of school _____

1. Teaching Ability: What techniques does this teacher employ? Is his course comprehensive yet enjoyed by students? Does he enjoy teaching?

2. Co-operativeness: How does the teacher co-operate in the school program or other academic areas? Co-operative in community affairs?

3. Inventiveness: What new ideas does he use, or has produced, in teaching? What new devices?

4. Initiative: Be specific. Has failure stopped him? Does he adapt his methods to new situations?

5. Principal Strength of Candidate:

6. Principal Weakness of Candidate:

7. Other Important Information:

Name of recommending person _____

Address _____ Official position _____

_____

Date _____

National Association of Biology Teachers

OUTSTANDING HIGH SCHOOL BIOLOGY TEACHER AWARD

State Director:

National Chairman:
William L. Brisby
Moorpark College
Moorpark, California

CANDIDATE'S RECORD FORM

The candidate should complete this form with complete information for the items requested. Use additional sheets if necessary. Return to State Director by JANUARY 1

Name _____ Date of birth _____

School in which you teach _____

Address of school _____

School telephone number _____ Home telephone number _____

Residential address _____

City _____ Zone number _____

Publications in professional or scientific journals.

What professional journals and scientific journals do you read regularly?

List the professional, scientific, or educational organizations (local, state, and national) in which you are a member.

What offices, committee assignments, or program duties have you held in the above organizations?

In what other pertinent school or community activities have you been engaged?

What scholarships, awards, honors have you received?

Education record (Include Institute, special program, etc., attendance)

College or University	Attendance dates	Years	Degree	Field

Positions held (professional, teaching, administrative) in chronological order.

Name of organization or school	Position	Years	Number of biology classes per day

What types of teacher certification do you have?

What other pertinent information (programs, courses initiated, unusual teaching procedures, etc.) can you list to assist the selection committee?

Academic preparation (Show courses studied in college in the fields below, including Institutes, course number, title of course, year taken, number of semester hours earned, and grades received.)

Course No. Course Title Year Semester Hours

BIOLOGICAL SCIENCES

Course No. Course Title Year Semester Hours

EDUCATION

MATHEMATICS

CHEMISTRY

PHYSICS

EARTH SCIENCES

Write a brief essay about your biology teaching. This should include a short discussion of your teaching philosophy and the role of biology in general education. You might describe any of your activities not covered in the above items.

The following persons have been asked to submit a recommendation on my behalf:

	Name	Title	Address
1.			
2.			

APPENDIX F

TABLES

TABLE II

NUMBER AND PERCENT OF TOTAL RESPONSES FROM ALL JUDGE-GROUPS BY RATING LEVELS FOR EACH ITEM

Item		Rating level						Chi square significance[a]
		1	2	3	4	5	N	
A.	FACTORS DERIVED FROM NOMINATION AND RECOMMENDATION FORMS:							
1.	Status or position of person making nomination or recommendation comments.	[b] 58 [c] 17.2	47 13.9	103 30.5	83 24.6	47 13.9	26	N.S.
2.	Comments about teaching ability.	2 6.0	11 3.1	28 7.9	75 21.2	238 67.2	4	N.S.
3.	Comments about teaching techniques.	4 1.1	9 2.5	34 9.6	78 22.0	229 64.7	4	N.S.
4.	Comments about comprehensiveness of course.	8 2.3	36 10.4	104 30.0	119 34.3	80 23.1	11	N.S.
5.	Comments about interest in teaching.	9 2.5	8 2.3	23 6.5	77 21.8	236 66.9	5	N.S.
6.	Comments about interest of students in classes.	2 0.6	14 4.0	34 9.6	72 20.4	231 65.4	5	N.S.

[a]Chi square between rating levels.

[b]Number of responses to item.

[c]Percent of responses to item.

NOTE: 1 = Not Important; 2 = Rarely Important; 3 = Sometimes Important; 4 = Usually Important; 5 = Always Important; N = Not Applicable; N.S. = Not Significant.

TABLE II (continued)

Item		Rating level 1	2	3	4	5	N	Chi square significance[a]
7. Comments about the teacher's co-operativeness in the total school program.	b	3	30	75	123	119	8	N.S.
	c	0.9	8.6	21.4	35.1	34.0		
8. Comments about the teacher's co-operativeness in community affairs.		13	47	144	93	53	8	N.S.
		3.7	13.4	41.1	26.6	15.1		
9. Comments about initiative.		2	7	32	111	201	5	N.S.
		0.6	2.0	9.1	31.4	56.9		
10. Comments about inventiveness.		3	10	43	105	193	4	N.S.
		0.8	2.8	12.1	29.7	54.5		
11. Comments about adaptability.		3	22	75	104	147	7	N.S.
		0.9	6.3	21.4	29.6	41.9		
12. Comments about principal strengths.		4	20	68	118	142	6	N.S.
		1.1	5.7	19.3	33.5	40.3		
13. Comments about principal weaknesses.		14	38	93	93	109	11	N.S.
		4.0	11.0	26.8	26.8	31.4		
B. FACTORS RELATED TO ACADEMIC BACKGROUND:								
1. Reputation of schools, colleges or universities attended.		68	87	110	52	15	26	N.S.
		20.5	26.2	33.1	15.7	4.5		
2. Recency of academic experiences.		12	27	112	121	81	5	N.S.
		3.4	7.6	31.7	34.3	22.9		

TABLE II (continued)

Item		Rating level 1	2	3	4	5	N	Chi square significance[a]
3. Evidences of continuing education.	b	3	8	30	116	198	3	N.S.
	c	0.8	2.3	8.5	32.7	55.8		
4. Participation in institutes, seminars, special programs.		2	12	53	136	153	2	N.S.
		0.6	3.4	14.9	38.2	43.0		
5. Undergraduate degree in biological sciences.		12	45	85	111	94	11	N.S.
		3.5	13.0	24.5	32.0	27.1		
6. Undergraduate degree in education.		47	105	118	56	12	20	N.S.
		13.9	31.1	34.9	16.6	3.6		
7. Undergraduate degree in liberal arts.		44	86	125	68	10	25	N.S.
		13.2	25.8	37.5	20.4	3.0		
8. Graduate degree in biological sciences.		12	20	67	140	111	8	N.S.
		3.4	5.7	19.1	40.0	31.7		
9. Graduate degree in education.		33	93	128	70	11	23	N.S.
		9.9	27.8	38.2	20.9	3.3		
10. Type of teaching certificate.		77	84	53	82	36	26	N.S.
		23.2	25.3	16.0	24.7	10.8		
11. Number of hours for courses in biological sciences.		8	22	69	128	124	7	N.S.
		2.3	6.3	19.7	36.5	35.3		
12. Variety of courses in biological sciences.		7	14	67	138	123	9	N.S.
		2.0	4.0	19.2	39.5	35.2		
13. Grade point average in biological sciences.		24	37	125	120	40	12	N.S.
		6.9	10.7	36.1	34.7	11.6		

TABLE II (continued)

Item		Rating level 1	2	3	4	5	N	Chi square significance[a]
14. Number of hours for courses in Chemistry.	b	14	36	143	130	26	9	N.S.
	c	4.0	10.3	41.0	37.2	7.4		
15. Variety of chemistry courses.		20	56	152	78	28	15	N.S.
		8.5	16.3	44.3	22.7	8.2		
16. Grade point average in chemistry courses.		46	87	134	61	10	20	N.S.
		13.6	25.7	39.6	18.0	3.0		
17. Number of hours for courses in Physics.		39	70	157	67	12	13	N.S.
		11.3	20.3	45.5	19.4	3.5		
18. Variety of physics courses.		51	90	143	34	12	28	N.S.
		15.5	27.3	43.3	10.3	3.6		
19. Grade point average in physics courses.		59	110	124	30	10	25	N.S.
		17.7	33.0	37.2	9.0	3.0		
20. Number of hours for courses in Mathematics.		30	87	143	73	14	11	N.S.
		8.6	25.1	41.2	21.0	4.0		
21. Variety of mathematics courses.		46	101	130	52	13	16	N.S.
		13.5	29.5	38.0	15.2	3.8		
22. Grade point average in mathematics courses.		61	115	114	41	6	21	N.S.
		18.1	34.1	33.8	12.2	1.8		
23. Number of hours for courses in earth sciences.		35	74	147	70	18	14	N.S.
		10.2	21.5	42.7	20.3	5.2		

TABLE II (continued)

Item		Rating level 1	2	3	4	5	N	Chi square significance[a]
24. Variety of earth sciences courses.	b	45	82	141	55	15	20	N.S.
	c	13.3	24.3	41.7	16.3	4.4		
25. Grade point average in earth science courses.		64	99	119	44	8	24	N.S.
		19.2	29.6	35.6	13.2	2.4		
26. Number of hours for courses in Education.		55	81	140	63	2	17	N.S.
		16.1	23.8	41.1	18.5	0.6		
27. Variety of professional education courses.		49	80	125	71	11	22	N.S.
		14.6	23.8	37.2	21.1	3.3		
28. Grade point average in professional education courses.		68	89	101	66	9	25	N.S.
		20.4	26.7	30.3	19.8	2.7		
29. Apparent interest in self-improvement.		3	5	14	73	258	5	.05
		0.8	1.4	4.0	20.7	73.1		
C. FACTORS RELATED TO TEACHING AND OTHER EXPERIENCES:								
1. Number of years teaching experience.		11	25	95	156	66	5	N.S.
		3.1	7.1	26.9	44.2	18.7		
2. Number of years teaching science.		12	21	92	158	70	5	N.S.
		3.4	5.9	2.1	44.8	19.8		
3. Number of years teaching biology.		8	11	62	149	122	6	N.S.
		2.3	3.1	17.6	42.3	34.7		

TABLE II (continued)

Item		Rating level 1	2	3	4	5	N	Chi square significance[a]
4. Types or levels of biology classes taught.	b	13	26	90	134	82	13	N.S.
	c	3.8	7.5	26.1	38.8	23.8		
5. Number of other science classes taught daily.		23	57	135	105	18	20	N.S.
		6.8	16.9	39.9	31.1	5.3		
6. Number of biology classes taught daily.		13	26	108	120	80	11	N.S.
		3.7	7.5	31.1	34.6	23.1		
7. Administrative or supervisory responsibilities.		40	54	129	92	25	18	N.S.
		11.8	15.9	37.9	27.1	7.4		
8. Size of school where teaching.		68	109	89	46	12	34	N.S.
		21.0	33.6	27.5	14.2	3.7		
9. Location of school where teaching.		114	100	64	31	7	42	N.S.
		36.1	31.6	20.3	9.8	2.2		
10. Variety of schools where teacher has taught.		89	109	105	27	3	25	N.S.
		26.7	32.7	31.5	8.1	0.9		
11. Involvement in personal scientific research.		4	42	119	123	61	9	.05
		1.1	12.0	34.1	35.2	17.5		
12. Work experiences in science research.		6	59	136	104	41	12	N.S.
		1.7	17.1	39.3	30.1	11.8		
13. Work experiences in business or industry.		52	95	124	52	5	30	N.S.
		15.9	29.0	37.8	15.9	1.5		

TABLE II (continued)

Item		Rating Level 1	2	3	4	5	N	Chi square significance[a]
14. Hobby or avocational interests.	b	22	70	148	70	34	14	N.S.
	c	6.4	20.3	43.0	20.3	9.9		
15. Contributory travel experiences.		30	57	152	75	24	20	N.S.
		8.9	16.9	45.0	22.2	7.1		
D. FACTORS RELATED TO PROFESSIONAL ACTIVITIES AND ACCOMPLISHMENTS:								
1. Number of memberships in professional organizations.		16	44	119	112	64	3	N.S.
		4.5	12.4	33.5	31.5	18.0		
2. Memberships in honorary professional science organizations.		13	50	112	113	68	2	N.S.
		3.7	14.0	31.5	31.7	19.1		
3. Memberships in honorary professional education organizations.		36	78	139	61	32	12	N.S.
		10.1	22.5	40.2	17.6	9.2		
4. Participation in professional organizations.		11	25	88	123	109	2	N.S.
		3.1	7.0	24.7	34.6	30.6		
5. Number and kinds of offices, duties and assignments held in professional organizations.		19	37	120	110	71	1	N.S.
		5.3	10.4	33.6	30.8	19.9		
6. Participation in other school, state, and community organizations.		14	44	123	118	55	4	N.S.
		4.0	12.4	34.7	33.3	15.5		
7. Types of professional journals read.		11	29	95	133	89	1	N.S.
		3.1	8.1	26.6	37.3	24.9		

TABLE II (continued)

Item		Rating level 1	2	3	4	5	N	Chi square significance[a]
8. Number of professional journals read.	b	22	63	133	94	41	5	N.S.
	c	6.2	17.8	37.7	26.6	11.6		
9. Publications made in professional and other journals.		17	39	111	91	93	7	N.S.
		4.8	11.1	31.6	25.9	26.5		
10. Number of scholarships, honors, grants, and awards received.		12	19	109	127	86	5	N.S.
		3.4	5.4	30.9	36.0	24.4		
11. Sponsorship or consultant to seminars, institutes, workshops for teachers.		6	16	97	125	103	11	N.S.
		1.7	4.6	28.0	36.0	29.7		
12. Participation in development of courses, curriculum materials, texts.		5	14	70	128	137	4	N.S.
		1.4	4.0	19.8	36.2	38.7		
13. Sponsorship of clubs, institutes, seminars, fairs, for students.		3	17	86	133	116	3	N.S.
		0.8	4.8	24.2	37.5	32.7		
14. Activities and accomplishments of students.		4	20	84	106	134	10	.05
		1.1	5.7	24.1	30.5	38.5		
E. FACTORS RELATED TO SCHOOL AND AND COMMUNITY RELATIONS:								
1. Cooperativeness with colleagues.		5	28	76	145	98	6	N.S.
		1.4	8.0	21.6	41.2	27.8		

TABLE II (continued)

Item		Rating level 1	2	3	4	5	N	Chi square significance[a]
2. Participation in school activities.	b	13	29	99	152	61	4	N.S.
	c	3.7	8.2	28.0	42.9	17.2		
3. Participation in civic affairs.		21	49	154	99	24	11	N.S.
		6.1	14.1	44.4	28.5	6.9		
4. Participation in political affairs.		86	110	94	25	4	39	N.S.
		27.0	34.5	29.5	7.8	1.3		
5. Participation in social affairs.		92	114	95	22	6	29	N.S.
		28.0	34.7	28.9	6.7	1.8		
6. Participation in religious affairs.		112	90	85	22	6	43	N.S.
		35.6	28.6	27.0	7.0	1.9		
7. Concerns for school-community relationships.		6	24	119	144	61	4	N.S.
		1.7	6.8	33.6	40.7	17.2		
8. Initiative in assuming school responsibilities.		3	17	81	133	114	10	N.S.
		0.9	4.9	23.3	38.2	32.8		
9. Efficiency in handling school records, reports and accounts.		37	72	99	89	36	25	N.S.
		11.1	21.6	29.7	26.7	10.8		

F. FACTORS RELATED TO TEACHER, SUBJECT, STUDENT, CLASSROOM RELATIONSHIPS:

1-4 were not adaptable to statistical analysis as discussed in Chapter IV

TABLE II (continued)

Item		Rating level 1	2	3	4	5	N	Chi square significance[a]
5. Interest and enthusiasm for biology.	b	3	2	15	58	276	4	.001
	c	0.8	0.6	4.2	16.4	78.0		
6. Concerns for student understandings of essential concepts.		5	4	27	67	250	5	.01
		1.4	1.1	7.6	19.0	70.8		
7. Concerns for student understandings of essential science processes.		4	6	23	78	238	9	.01
		1.1	1.7	6.6	22.3	68.2		
8. Concerns for student understandings of the structure of the science of biology.		0	18	45	107	177	11	N.S.
		0.0	5.2	13.0	30.8	51.0		
9. Efforts to encourage student development of hypotheses and theories.		5	9	38	105	192	9	.05
		1.4	2.6	10.9	30.1	55.0		
10. Concerns for student understandings of human implications of modern biological developments.		3	12	33	97	209	4	N.S.
		0.8	3.4	9.3	27.4	49.0		
11. Concerns for personal involvement of students in learning activities.		0	8	17	87	240	6	.01
		0.0	2.3	4.8	24.7	68.2		
12. Understandings of the learning process.		3	15	45	97	183	15	N.S.
		0.9	4.4	13.1	28.3	53.4		

TABLE II (continued)

Item		Rating level 1	2	3	4	5	N	Chi square significance[a]
13. Confidence in knowledge of subject matter.	b	2	7	32	107	202	8	N.S.
	c	0.6	2.0	9.1	30.6	57.7		
14. Ability to organize and present materials.		0	10	26	84	234	4	N.S.
		0.0	2.8	7.3	23.7	66.1		
15. Ability to develop a classroom climate conducive to learning.		0	5	17	46	285	5	.05
		0.0	1.4	4.8	13.0	80.7		
16. Skill in use of a variety of materials and methods.		4	2	25	109	213	5	.05
		1.1	0.6	7.1	30.9	60.3		
17. Leadership in determining tone of classroom activities.		2	6	34	125	178	13	N.S.
		0.6	1.7	9.9	36.2	51.6		
18. Provisions for experience-centered learning.		2	7	35	106	202	6	N.S.
		0.6	2.0	9.9	30.1	57.4		
19. Laboratory experiences characterized by thought provoking problems.		3	8	28	97	215	7	.05
		0.9	2.3	8.0	27.6	61.3		
20. Appearance of classroom and laboratory.		13	30	111	89	80	35	N.S.
		4.0	9.3	34.4	27.6	24.8		
21. Evidences of creativity.		0	9	23	107	211	8	.05
		0.0	2.6	6.6	30.6	60.3		
22. Evidences of resourcefulness.		2	8	25	101	214	8	.01
		0.6	2.3	7.1	28.9	61.1		

TABLE II (continued)

Item		Rating level 1	2	3	4	5	N	Chi square significance[a]
23. Evidences of ingenuity	b	0	10	21	103	214	10	.01
	c	0.0	2.9	6.0	29.6	61.5		
24. Perceptions of individual student needs.		1	10	34	81	220	12	.05
		0.3	2.9	9.8	23.4	63.6		
25. Provisions for differing student interests and abilities.		0	8	24	124	188	14	.05
		0.0	2.3	7.0	36.0	54.7		
26. Ability to encourage self-motivation in students.		2	11	19	82	230	14	.001
		0.6	3.2	5.5	23.8	66.9		
27. Ability to inspire self-confidence in students.		3	7	27	87	216	18	.01
		0.9	2.1	7.9	25.6	63.5		
28. Facilitates worthwhile student interaction.		0	2	46	118	176	16	.05
		0.0	0.6	13.5	34.5	51.5		
29. Emotional poise and self-confidence.		2	11	34	120	171	20	.05
		0.6	3.3	10.1	35.1	50.6		
30. Habits of dress, voice, mannerisms, speech.		9	18	100	142	64	25	.05
		2.7	5.4	30.0	42.6	19.2		
31. Adequacy of self concept.		3	10	72	135	90	48	.01
		1.0	3.2	23.2	43.5	29.0		
32. Concerns for personal growth.		2	13	38	105	180	20	N.S.
		0.6	3.8	11.2	31.1	53.3		
33. Sense of humor.		8	18	46	129	135	22	N.S.
		2.4	5.4	13.7	38.4	40.2		
34. Tolerance for ambiguity.		12	23	92	107	69	55	N.S.
		4.0	7.6	30.4	35.3	22.8		
35. Favorable perceptions by students and parents.		5	15	58	132	121	25	.05
		2.1	4.5	17.4	39.6	36.3		

TABLE III

FACTORS FOUND TO DIFFER SIGNIFICANTLY BETWEEN VARIOUS JUDGE-GROUPS

Judge-Group		Rating level 1	2	3	4	5
Apparent interest in self-improvement						
Secondary school teachers	a	0	0	1	15	25
	b	0.0	0.0	2.4	36.6	61.0
Public school administrators		0	0	1	6	9
		0.0	0.0	6.3	37.5	56.3
Public school science supervisors		0	2	1	1	8
		0.0	16.7	8.3	8.3	66.7
State science supervisors		0	0	2	4	12
		0.0	0.0	11.1	22.2	66.7
Industrial biologists		0	0	0	4	9
		0.0	0.0	0.0	30.8	69.2
College biologists		3	0	3	12	31
		6.1	0.0	6.1	24.5	63.3
Professors of science education		0	0	1	4	19
		0.0	0.0	4.2	16.7	79.2
Emotional poise and self-confidence						
Secondary school teachers		0	0	4	15	18
		0.0	0.0	10.8	40.5	48.6
Public school administrators		0	0	2	8	5
		0.0	0.0	13.3	53.3	33.3
Public school science supervisors		0	2	2	1	7
		0.0	16.7	16.7	8.3	58.3
State science supervisors		0	0	6	6	5
		0.0	0.0	35.3	35.3	29.4

[a]Number of responses.

[b]Percent of responses.

NOTE: 1 = Not important; 2 = Rarely important; 3 = Sometimes important; 4 = Usually important; 5 = Always important.

TABLE III (continued)

Judge-Group		Rating level 1	2	3	4	5
Industrial biologists	a	0	0	0	5	7
	b	0.0	0.0	0.0	41.7	58.3
College biologists		1	4	5	21	15
		2.2	8.7	10.9	45.7	32.6
Professors of science education		1	1	0	8	12
		4.5	4.5	0.0	36.4	54.5
Concerns for student understandings of essential concepts						
Secondary school teachers		0	0	4	12	25
		0.0	0.0	9.8	29.3	61.0
Public school administrators		0	0	0	6	10
		0.0	0.0	0.0	37.5	62.5
Public school science supervisors		0	2	3	2	5
		0.0	16.7	25.0	16.7	41.7
State science supervisors		0	0	5	4	9
		0.0	0.0	27.8	22.2	50.0
Industrial biologists		1	0	0	0	12
		7.7	0.0	0.0	0.0	92.3
College biologists		2	2	3	13	28
		4.2	4.2	6.3	27.1	58.3
Professors of science education		0	0	1	5	17
		0.0	0.0	4.3	21.7	73.9
Interest and enthusiasm for biology						
Secondary school teachers		0	0	1	12	28
		0.0	0.0	2.4	29.3	68.3
Public school administrators		0	0	0	5	11
		0.0	0.0	0.0	31.3	68.8
Public school science supervisors		0	1	2	0	9
		0.0	8.3	16.7	0.0	75.0
State science supervisors		0	0	1	7	9
		0.0	0.0	5.9	41.2	52.9

TABLE III (continued)

Judge-Group		Rating level 1	2	3	4	5
Industrial biologists	a	0	0	0	2	10
	b	0.0	0.0	0.0	16.7	83.3
College biologists		2	1	5	11	30
		4.1	2.0	10.2	22.4	61.2
Professors of science education		0	0	0	3	21
		0.0	0.0	0.0	12.5	87.5
Activities and accomplishments of students						
Secondary school teachers		0	5	16	13	6
		0.0	12.5	40.0	32.5	15.0
Public school administrators		0	0	0	11	5
		0.0	0.0	0.0	68.8	31.3
Public school science supervisors		0	2	3	3	4
		0.0	16.7	25.0	25.0	33.3
State science supervisors		0	1	5	6	6
		0.0	5.6	27.8	33.3	33.3
Industrial biologists		0	0	0	5	8
		0.0	0.0	0.0	38.5	61.5
College biologists		2	3	14	16	12
		4.3	6.4	29.8	34.0	25.5
Professors of science education		0	2	3	7	12
		0.0	8.3	12.5	29.2	50.0
Ability to inspire self-confidence in students						
Secondary school teachers		1	0	4	14	20
		2.6	0.0	10.3	35.9	51.3
Public school administrators		0	0	2	4	10
		0.0	0.0	12.5	25.0	62.5
Public school science supervisors		0	2	1	1	7
		0.0	18.2	9.1	9.1	63.6

TABLE III (continued)

Judge-Group		Rating level 1	2	3	4	5
State science supervisors	a	0	0	0	5	13
	b	0.0	0.0	0.0	27.8	72.2
Industrial biologists		0	0	1	2	9
		0.0	0.0	8.3	16.7	75.0
College biologists		0	3	6	16	21
		0.0	6.5	13.0	34.8	45.7
Professors of science education		0	2	2	3	16
		0.0	8.7	8.7	13.0	69.6
Adequacy of self-concept						
Secondary school teachers		0	2	10	16	8
		0.0	5.6	27.8	44.4	22.2
Public school administrators		1	1	2	10	2
		6.3	6.3	12.5	62.5	12.5
Public school science supervisors		0	3	1	3	5
		0.0	25.0	8.3	25.0	41.7
State science supervisors		0	0	5	8	5
		0.0	0.0	27.8	44.4	27.8
Industrial biologists		0	1	2	7	2
		0.0	8.3	16.7	58.3	16.7
College biologists		1	1	15	13	5
		2.9	2.9	42.9	37.1	14.3
Professors of science education		0	1	4	6	8
		0.0	5.3	21.1	31.6	42.1
Concerns for student understandings of essential science processes						
Secondary school teachers		0	1	2	14	24
		0.0	2.4	4.9	34.1	58.5

TABLE III (continued)

Judge-Group		Rating level 1	2	3	4	5
Public school administrators	a	0	0	1	8	7
	b	0.0	0.0	6.3	50.0	43.8
Public school science supervisors		0	2	3	2	5
		0.0	16.7	25.0	16.7	41.7
State science supervisors		0	0	1	6	11
		0.0	0.0	5.6	33.3	61.1
Industrial biologists		1	0	0	0	12
		7.7	0.0	0.0	0.0	92.3
College biologists		2	2	6	11	25
		4.3	4.3	13.0	23.9	54.3
Professors of science education		0	0	0	6	17
		0.0	0.0	0.0	26.1	73.9

TABLE IV

FACTORS FOUND TO BE RATED SIGNIFICANTLY DIFFERENT FOR EVALUATING BIOLOGY TEACHERS, LISTED BY INDIVIDUAL JUDGE-GROUPS

Item	Percent		
	Usually important	Always important	Total
SECONDARY-SCHOOL TEACHERS			
Apparent interest in self-improvement	36.6	61.0	97.6
Interest and enthusiasm for biology	29.3	68.3	97.6
Concerns for student understandings of essential science processes	34.1	58.5	92.6
Concerns for student understandings of essential concepts	29.3	61.0	90.3
Emotional poise and self-confidence	40.5	48.6	89.1
Ability to inspire self-confidence in students	35.9	51.3	87.2
Adequacy of self-concept	44.4	22.2	66.6
Activities and accomplishments of students	32.5	15.0	47.5
PUBLIC SCHOOL ADMINISTRATORS			
Concerns for student understandings of essential concepts	37.5	62.5	100.0
Interest and enthusiasm for biology	31.3	68.8	100.0
Activities and accomplishments of students	68.8	31.3	100.0
Concerns for student understandings of essential science processes	50.0	43.8	93.8
Apparent interest in self-improvement	37.5	56.3	93.8
Ability to inspire self-confidence in students	25.0	62.5	87.5
Emotional poise and self-confidence	53.3	33.3	86.6
Adequacy of self-concept	62.5	12.5	75.0

TABLE IV (continued)

Item	Percent		
	Usually important	Always important	Total
PUBLIC SCHOOL SCIENCE SUPERVISORS			
Apparent interest in self-improvement	8.3	66.7	75.0
Interest and enthusiasm for biology	0.0	75.0	75.0
Ability to inspire self-confidence in students	9.1	63.6	72.7
Adequacy of self-concept	25.0	41.7	66.7
Emotional poise and self-confidence	8.3	58.3	66.6
Concerns for student understandings of essential concepts	16.7	41.7	58.4
Concerns for student understandings of essential science processes	16.7	41.7	58.4
Activities and accomplishments of students	25.0	33.3	58.3
STATE SCIENCE SUPERVISORS			
Ability to inspire self-confidence in students	27.8	72.2	100.0
Concerns for student understandings of essential science processes	33.3	61.1	94.4
Interest and enthusiasm for biology	41.2	52.9	94.1
Apparent interest in self-improvement	22.2	66.7	88.9
Concerns for student understandings of essential concepts	22.2	50.0	72.2
Adequacy of self-concept	44.4	27.8	72.2
Activities and accomplishments of students	33.3	33.3	66.6
Emotional poise and self-confidence	35.3	29.4	64.7

TABLE IV (continued)

Item	Percent		
	Usually important	Always important	Total
INDUSTRIAL BIOLOGISTS			
Apparent interest in self-improvement	30.8	69.2	100.0
Emotional poise and self-confidence	41.7	58.3	100.0
Interest and enthusiasm for biology	16.7	83.3	100.0
Activities and accomplishments of students	38.5	61.5	100.0
Concerns for student understandings of essential science processes	0.0	92.3	92.3
Concerns for student understandings of essential concepts	0.0	92.3	92.3
Ability to inspire self-confidence in students	16.7	75.0	91.7
Adequacy of self-concept	58.3	16.7	75.0
COLLEGE BIOLOGISTS			
Apparent interest in self-improvement	24.5	63.3	87.8
Concerns for students understandings of essential concepts	27.1	58.3	85.4
Interest and enthusiasm for biology	22.4	61.2	83.6
Ability to inspire self-confidence in students	34.8	45.7	80.5
Emotional poise and self-confidence	45.7	32.6	78.3
Concerns for student understandings of essential science processes	23.9	54.3	78.2
Activities and accomplishments of students	34.0	25.5	59.5
Adequacy of self-concept	37.1	14.3	51.4

TABLE IV (continued)

Item	Percent		
	Usually important	Always important	Total
COLLEGE PROFESSORS OF SCIENCE EDUCATION			
Interest and enthusiasm for biology	12.5	87.5	100.0
Concerns for student understandings of essential science processes	26.1	73.9	100.0
Apparent interest in self-improvement	16.7	79.2	95.9
Concerns for student understandings of essential concepts	21.7	73.9	95.6
Emotional poise and self-confidence	36.4	54.5	90.9
Ability to inspire self-confidence in students . .	13.0	69.6	82.6
Activities and accomplishments of students	29.2	50.0	79.2
Adequacy of self-concept	31.6	42.1	73.7